19" Auto scan Colour Monitor

CHASSIS: CM25

109P2 CM25 GSIII

Service
Service
Service

EPA POLLUTION PREVENTER

109P20/00(PHILIPS)

DDC/Power saving/TCO

Service Manual

Horizontal frequencies
30 - 111kHz

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SAFETY NOTICE

ANY PERSON ATTEMPTING TO SERVICE THIS CHASSIS MUST FAMILIARIZE HIMSELF WITH THE CHASSIS AND BE AWARE OF THE NECESSARY SAFETY PRECAUTIONS TO BE USED WHEN SERVICING ELECTRONIC EQUIPMENT CONTAINING HIGH VOLTAGES.

CAUTION: USE A SEPARATE ISOLATION TRANSFORMER FOR THIS UNIT WHEN SERVICING.

REFER TO BACK COVER FOR IMPORTANT SAFETY GUIDELINES

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飛利浦

PHILIPS

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Important Safety Notice

Proper service and repair is important to the safe, reliable operation of all Philips Company** Equipment. The service procedures recommended by Philips and described in this service manual are effective methods of performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various CAUTIONS and NOTICES which should be carefully Read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper Service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Philips could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Philips has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Philips must first satisfy himself thoroughly that Neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

** Hereafter throughout this manual, Philips Company will be referred to as Philips.

WARNING

Critical components having special safety characteristics are identified with a ⚠ by the Ref. No. in the parts list and enclosed within a broken line* (where several critical components are grouped in one area) along with the safety symbol ⚠ on the schematics or exploded views.

Use of substitute replacement parts which do not have the same specified safety characteristics may create shock, fire, or other hazards.

Under no circumstances should the original design be modified or altered without written permission from Philips. Philips assumes no liability, express or implied, arising out of any unauthorized modification Of design.
Servicer assumes all liability.

*** Broken Line** ▬ ▪ ▬ ▪ ▬ ▪

FOR PRODUCTS CONTAINING LASER :

DANGER- Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM.

CAUTION- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION- The use of optical instruments with this product will increase eye hazard.

TO ENSURE THE CONTINUED RELIABILITY OF THIS PRODUCT, USE ONLY ORIGINAL MANUFACTURER'S REPLACEMENT PARTS, WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THIS SERVICE MANUAL.

Technical Data

Technical Specification*

CRT

Size and deflection :19 inch/46cm,90°defection angle
Dot pitch/Grille pitch : 0.24mm

Tube type : Aperture grille, flat, high contrast, anti-glare, anti-static, anti reflection, light transmission 41%
Phosphor : P22

Recommended display area : 14.0"x10.4"/355 x 265 mm

Maximum display area : 14.4"x10.8"/365 x 274 mm

Scanning

Horizontal scanning : 30 - 111 KHz
Vertical scanning : 50 - 160 Hz

Video

Video dot rate : 261 Mhz
Input impedance
-Video : 75 Ohm
- Sync : 2.2 kOhm
Input signal levels : 0.7Vpp
Separate sync
Sync input signal : Composite sync
Sync polarities : Positive and negative

White Color Temperature

Chromaticity CIE coordinates:

at 9300 °k	x = 0.283	y = 0.297
6500 °k	x = 0.313	y = 0.329
5500 °k	x = 0.332	y = 0.347

Physical Specifications

Dimensions : 456x476x437mm(including base)
456x416x437mm(excluding base)
weight : 23.5 Kg

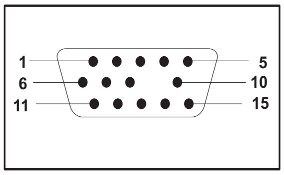
Power supply : 90 - 264 VAC, 50/60HZ

Operating condition
Temperature : 0 °C - 35 °C
Relative Humidety : 10 % - 90 %

Storage condition
Temperature : - 25 °C - 60 °C
Relative Humidity : 5 % - 95 %

Pin assignment :

The 15-pin D-sub connector(male) of the signal cable (IBM systems) :



Pin No.	Assignment	Pin No.	Assignment
1	Red video input	9	No pin
2	Green video input	10	Logic ground
3	Blue video input	11	Identification output - Connected to pin 10
4	Identification output - Connected to pin 10	12	Serial data line(SDA)
5	Ground	13	H.Sync /H+V
6	Red video ground	14	V.Sync(VCLK for DDC)
7	Green video ground	15	Data clock line(SCL)
8	Blue video ground		

Automatic Power Saving

If you have VESA's DPMS compliance display card or software installed in your PC,the monitor can automaticlly reduce its power consumption when not in use. And if an input from a keyboard, mouse or other input devices is detected, the monitor will automatically "wake up". The following table shows the power consumption and signalling of this automatic power saving features :

Power Management Definition

VESA's mode	VIDEO	H-SYNC	V-SYNC	POWER USED	POWER SAVING(%)	LED COLOR
ON	Active	Yes	Yes	Typical 120W	0 %	Green
Stand-by	Blanked	No	Yes	< 6 W	95 %	Yellow
Suspend	Blanked	Yes	No	< 6 W	95 %	Yellow
OFF	Blanked	No	No	< 3 W	97 %	Amber

This monitor is Energy Star® compliant .As an ENERGY STAR® Partner, PHILIPS has determined that this product meets the ENERGY STAR® guidelines for energy efficiency.

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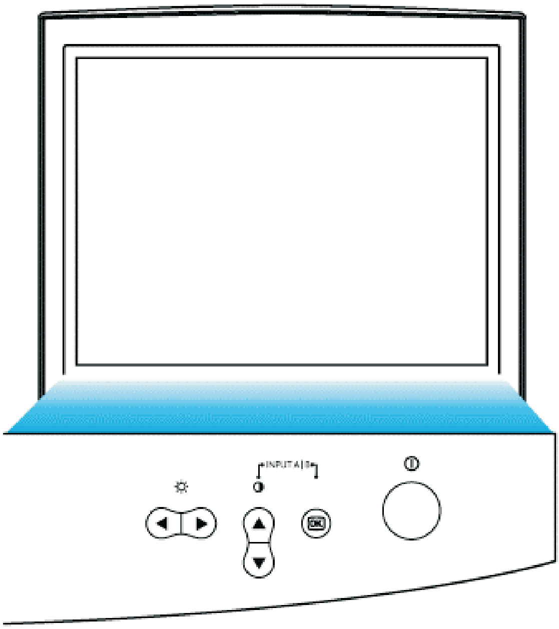
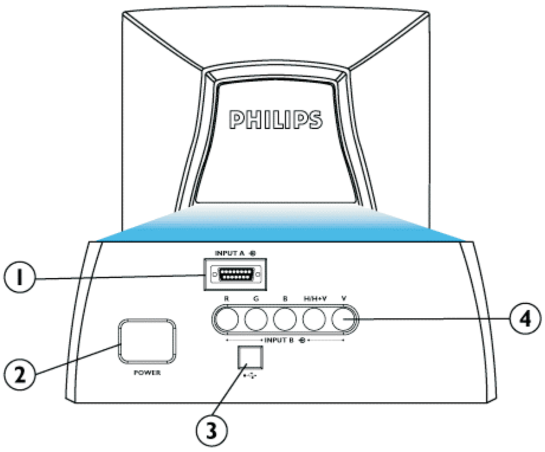
Front View and Back View

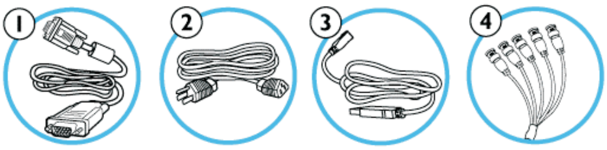
Front View

Front View



⏻	Power button switches your monitor on.
OK	OK button which when pressed will take you to the OSD controls
◑	Contrast hotkey. When the UP arrow is pressed, the adjustment controls for the CONTRAST will show up.
▲ ▼	UP and DOWN buttons are used when adjusting the OSD of your monitor
☼	Brightness hotkey. When both the LEFT and RIGHT arrows are pressed at the same time, then the adjustment controls for BRIGHTNESS will show up.
◀ ▶	LEFT and RIGHT buttons, like the UP and DOWN buttons, are also used in adjusting the OSD of your monitor.
INPUT A|B	By pressing both the UP and OK buttons, you can easily access the Input Signals A and/or B.





1. D-Sub Port - Attach the D-Sub connector that comes with your monitor here. Other end connects to your PC.

2. Power in - Attach power cable here.

3. USB Port - Attach your USB Upstream cable here. Connect the other end to your USB hub or your PC's USB connector.

4. BNC Connectors - Attach the connectors here to get the best video performance from your monitor

OSD Adjustment

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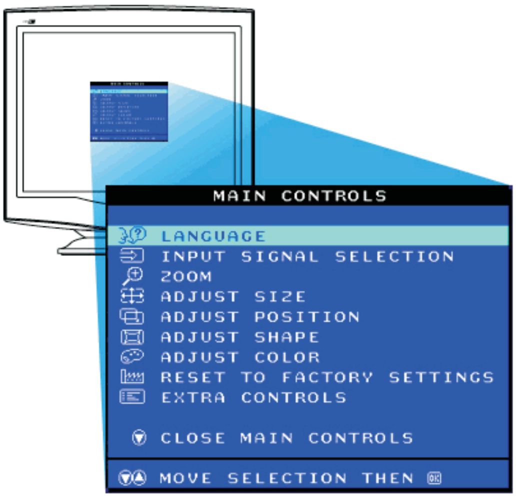
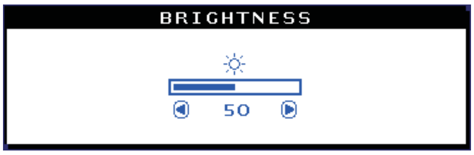
On the front controls of your monitor, once you press the OK button, the OSD Main Controls window will pop up and you can now start making adjustment to your monitor's various features. Use the ◀ ▶ or the ▲ ▼ keys to make your adjustments within.


MAIN CONTROLS
LANGUAGE
INPUT SIGNAL SELECTION
ZOOM
ADJUST SIZE
ADJUST POSITION
ADJUST SHAPE
ADJUST COLOR
RESET TO FACTORY SETTINGS
EXTRA CONTROLS
CLOSE MAIN CONTROLS
MOVE SELECTION THEN OK

Brightness

To adjust your screen's brightness, follow the steps below. Brightness is the overall intensity of the light coming from the screen. A 50% brightness is recommended.

1. Press the ◀ or ▶ button on the monitor. The BRIGHTNESS window appears.

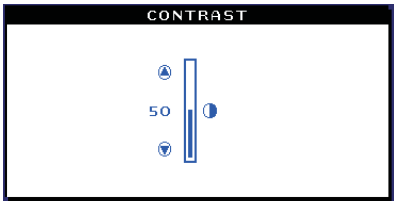

BRIGHTNESS
50

2. Press the ◀ or ▶ button to adjust the brightness.
3. When the brightness is adjusted to the level desired, stop pressing the ◀ or ▶ button and after three seconds the BRIGHTNESS window will disappear with the new adjustment saved.

Contrast

To adjust your screen's contrast, follow the steps below. Contrast is the difference between the light and dark areas on the screen. A 100% contrast is recommended.

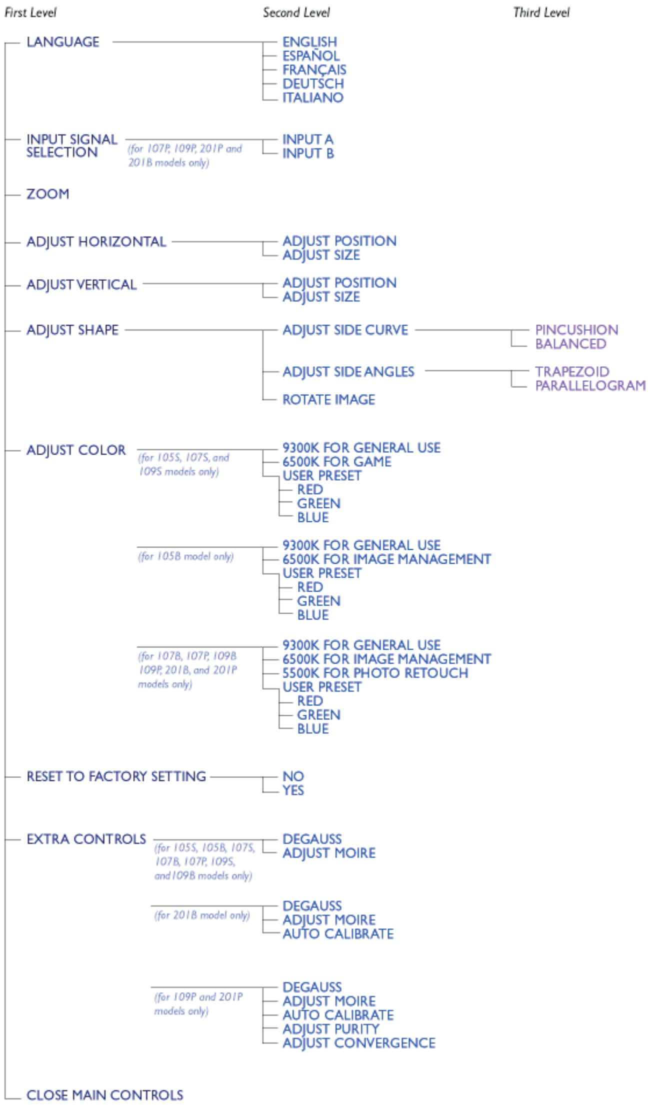
1. Press the ▲ or ▼ button on the monitor. The BRIGHTNESS window appears.


CONTRAST
50

2. Press the ▲ or ▼ button to adjust the brightness.
3. When the brightness is adjusted to the level desired, stop pressing the ▲ or ▼ button and after three seconds the BRIGHTNESS window will disappear with the new adjustment saved.

The OSD Tree

Below is an overall view of the structure of the OSD. You can use this as reference when you want to later on work your way around the different adjustments.


First Level
Second Level
Third Level
LANGUAGE
ENGLISH
ESPAÑOL
FRANÇAIS
DEUTSCH
ITALIANO
INPUT SIGNAL SELECTION
(for 107P, 109P, 201P and 201B models only)
INPUT A
INPUT B
ZOOM
ADJUST HORIZONTAL
ADJUST POSITION
ADJUST SIZE
ADJUST VERTICAL
ADJUST POSITION
ADJUST SIZE
ADJUST SHAPE
ADJUST SIDE CURVE
PINCUSHION
BALANCED
ADJUST SIDE ANGLES
TRAPEZOID
PARALLELOGRAM
ROTATE IMAGE
ADJUST COLOR
(for 105S, 107S, and 109S models only)
9300K FOR GENERAL USE
6500K FOR GAME
USER PRESET
RED
GREEN
BLUE
(for 105B model only)
9300K FOR GENERAL USE
6500K FOR IMAGE MANAGEMENT
USER PRESET
RED
GREEN
BLUE
(for 107B, 107P, 109B 109P, 201B, and 201P models only)
9300K FOR GENERAL USE
6500K FOR IMAGE MANAGEMENT
5500K FOR PHOTO RETOUCH
USER PRESET
RED
GREEN
BLUE
RESET TO FACTORY SETTING
NO
YES
EXTRA CONTROLS
(for 105S, 105B, 107S, 107B, 107P, 109S, and109B models only)
DEGAUSS
ADJUST MOIRE
(for 201B model only)
DEGAUSS
ADJUST MOIRE
AUTO CALIBRATE
(for 109P and 201P models only)
DEGAUSS
ADJUST MOIRE
AUTO CALIBRATE
ADJUST PURITY
ADJUST CONVERGENCE
CLOSE MAIN CONTROLS

• *Specifications are subject to change without prior notice.*

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OSD Lock Function & Service Mode

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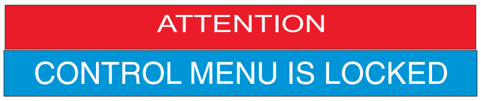
To lock (disable) OSD function:

- Press OSD button " " for over 15 seconds to lock the OSD function. Release it, then OSD comes on the screen as below.



ATTENTION

CONTROL MENU IS LOCKED

To unlock (enable) OSD function:

- Press OSD button " " for over 10 seconds again to unlock the OSD function. Release it, then OSD comes on the screen as below.

Disable/Enable all the WARNING SIGNAL

To disable all the WARNING SIGNAL :

- Disconnect the Interface cable of the monitor (Monitor is ON.).
- Press OSD button " " for over 15 seconds to disable all the WARNING SIGNAL. Then release the "OSD" button.
- If it is successful, then the signal " NO SIGNAL INPUT "disappeared to enter power saving-off mode.

To enable all the WARNING SIGNAL :

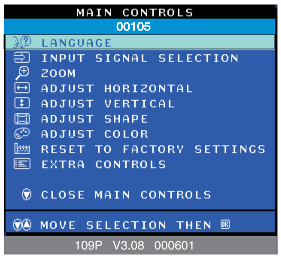
- After disconnect the Interface cable of the monitor, then Monitor is powered ON.
- If it is successful, the signal " NO SIGNAL INPUT " comes on the screen again later.

Access Service mode (burn in mode) :

Access Service Mode & Burn in mode

Firstly, get into Factory Adjustment Mode.

Push LEFT & RIGHT buttons at the same time for over 15 seconds and release them. The factory message appears at the bottom of the main OSD menu. (for example : 109P V3.08 000601; 00105 is M.T.B.F. in HOUR unit)



MAIN CONTROLS
00105
LANGUAGE
INPUT SIGNAL SELECTION
ZOOM
ADJUST HORIZONTAL
ADJUST VERTICAL
ADJUST SHAPE
ADJUST COLOR
RESET TO FACTORY SETTINGS
EXTRA CONTROLS
CLOSE MAIN CONTROLS
MOVE SELECTION THEN
109P V3.08 000601

- Disconnect the Interface cable of the monitor.
- Push LEFT & RIGHT buttons at the same time, then power ON.

- If it is successful, the signal " " comes on the screen later. (Background is white.).

Exit "burn in MODE" :

- Reconnect the interface cable to PC, then the "burn in MODE" Disappear.

Warning and Notes

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Warnings

1. Safety regulations require that the unit should be returned in its original condition and that components identical to the original components are used. The safety components are indicated by the symbol ⚠ .

2. In order to prevent damage to ICs and transistors, all high-voltage flash-overs must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is **0 V** (after approximately 30 seconds).

3. **ESD** ⚠ All ICs and many other semiconductors are sensitive to electrostatic discharges (ESD). Careless handling during repair can drastically shorten their life. Make sure that during repair you are connected by a pulse band with resistance to the same potential as the ground of the unit. Keep components and tools also at this same potential.

4. When repairing a unit, always connect it to the AC Power voltage via an isolating transformer.

5. Be careful when taking measurements in the high-voltage section and on the picture tube panel.

6. It is recommended that saferty goggles be worn when replacing the picture tube.

7. When making adjustments,use plastic rather than metal tools. This will prevent any short-circuit or the danger of a circuit becoming unstable.

8. Never replace modules or other components while the unit is switched on.

9. Together with the deflecitón unit, the picture tube is used as an integrated unit. Adjustment of this unit during repair is not recommended.

10. After repair, the wiring should be fastened in place with the cable clamps.

11. All units that are returned for service or repair must pass the original manufactures safety tests.

Notes

1. The direct voltages and waveforms are average voltages. They have been measured using the Service test software and under the following conditions :
   - Mode : 640 * 480 (31.5kHz / 60Hz)
   - Signal pattern : grey scale
   - Adjust brightness and contrast control for the mechanical mid-position (click position)

2. The picture tube panel has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.

3. The semiconductors indicated in the circuit diagram(s) and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

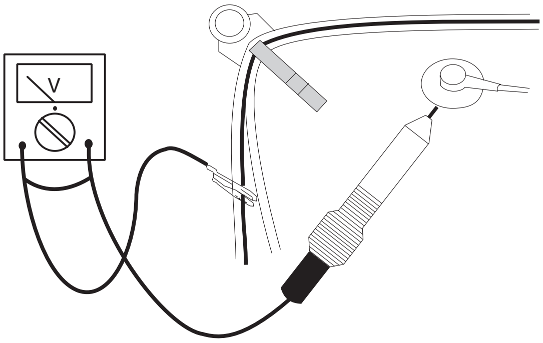

Fig.1

DDC DATA

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```
************************************************************
          MITSUBISHI GS3.chk
************************************************************

Vendor/Product Identification
          ID Manufacturer Name          :  PHL
          ID Product Code               :  0005(HEX.)
          ID Serial Number              :  123456(DEC.)
          Week of Manufacture           :  34
          Year of Manufacture           :  2000

EDID Version, Revision
          Version                       :  1
          Revision                      :  2

Basic Display Parameters/Features
          Video Input Definition        :  Analog Video Input
                                           0.700V/0.000V (0.70Vpp)
                                           without Blank-to-Black Setup
                                           Separate Sync
                                           Composite Sync
                                           without Sync on Green
                                           no Serration required
          Maximum H Image Size          :  36 cm
          Maximum V Image Size          :  27 cm
          Display Transfer Characteristic:  2.67
                    (gamma)

          Feature Support (DPMS)        :  Standby
                                           Suspend
                                           Active Off
          Display Type                  :  RGB color display
Color Characteristics
          Red   X coordinate            :  0.622
          Red   Y coordinate            :  0.339
          Green X coordinate            :  0.279
          Green Y coordinate            :  0.6
          Blue  X coordinate            :  0.149
          Blue  Y coordinate            :  0.072
          White X coordinate            :  0.283
          White Y coordinate            :  0.297
Established Timings
          Established Timings I         :  720 x 400 @70Hz (VGA,IBM)
                                           720 x 400 @88Hz (XGA2,IBM)
                                           640 x 480 @60Hz (VGA,IBM)
                                           640 x 480 @67Hz (Apple,MacII)
                                           640 x 480 @72Hz (VESA)
                                           640 x 480 @75Hz (VESA)
                                           800 x 600 @60Hz (VESA)
          Established timings II        :  800 x 600 @72Hz (VESA)
                                           800 x 600 @75Hz (VESA)
                                           832 x 624 @75Hz (Mac II)
                                           1024 x 768 @87Hz ( IBM)
                                           1024 x 768 @60Hz (VESA)
                                           1024 x 768 @70Hz (VESA)
                                           1024 x 768 @75Hz (VESA)
                                           1280 x 1024 @75Hz (VESA)

          Manufacturer's timings        : 1152 x 870 @75Hz (Mac II)
Standard Timing Identification #1
          Horizontal active pixels      :  1920
          Aspect Ratio                  :  4:3
          Refresh Rate                  :  60
Standard Timing Identification #2
          Horizontal active pixels      :  1792
          Aspect Ratio                  :  4:3
          Refresh Rate                  :  60
Standard Timing Identification #3
          Horizontal active pixels      :  1600
          Aspect Ratio                  :  4:3
          Refresh Rate                  :  75
Standard Timing Identification #4
          Horizontal active pixels      :  1280
          Aspect Ratio                  :  5:4
          Refresh Rate                  :  85
```

```
Standard Timing Identification #5
          Horizontal active pixels      :  1280
          Aspect Ratio                  :  5:4
          Refresh Rate                  :  60

Standard Timing Identification #6
          Horizontal active pixels      :  1024
          Aspect Ratio                  :  4:3
          Refresh Rate                  :  85

Detailed Timing #1
          Pixel Clock (MHz)             :  229.5
          H Active (pixels)             :  1600
          H Blanking (pixels)           :  560
          V Active (lines)              :  1200
          V Blanking (lines)            :  50
          H Sync Offset (F Porch) (pixels):  64
          H Sync Pulse Width (pixels)   :  192
          V Sync Offset (F Porch) (lines):  1
          V Sync Pulse Width (lines)    :  3
          H Image Size (mm)             :  355
          V Image Size (mm)             :  265
          H Border (pixels)             :  0
          V Border (lines)              :  0
          Flags                         :  Non-interlaced
                                           Normal Display, No stereo
                                           Digital Seperate Sync
                                           Positive V Sync
                                           Positive H Sync

Monitor Descriptor #2
          Serial Number                 :   TY  123456


Monitor Descriptor #3
          Monitor Name                  :  Philips 109P2


Monitor Descriptor #4
          Min. Vt rate Hz               :  50
          Max. Vt rate Hz               :  160
          Min. Horiz. rate kHz          :  30
          Min. Horiz. rate kHz          :  111
          Max. Supported Pixel          :  260

Extension Flag                          :  0

Check sum                               :  8B(hex)
```

```
                  * ************************************
                     EDID data for Mitsubishi CRT
                  **************************************

   0:00    1: ff    2:ff    3:ff    4:ff     5:ff    6:ff     7:00
   8: 41    9:0c   10:05   11:00   12:40    13:e2   14:01    15:00
  16: 22   17:0a   18:01   19:02   20:6c    21:25   22:1b    23:a7
  24: e9   25:7a   26:68   27:9f   28:56    29:47    30:99    31:26
  32: 12   33:48   34:4c   35:fd   36:ff    37:80   38:d1    39:40
  40: c1   41:40   42:a9   43:4f   44:81    45:99   46:81   47:80
  48: 61   49:59   50:45   51:59   52:31    53:59    54:a6   55:59
  56: 40   57:30   58:62   59:b0   60:32    61:40   62:40   63:c0
  64: 13   65:00   66:63   67:09   68:11    69:00   70:00   71:18
  72: 00   73:00   74:00   75:ff   76:00    77:20   78:54   79:59
  80: 20   81:20   82:31   83:32   84:33    85:34   86:35   87:37
  88: 0a   89:20   90:00   91:00   92:00    93:fc   94:00   95: 50
  96: 48   97:49   98:4c   99:49 100:50  101:53  102:20  103:31
 104: 30  105:39  106:50  107:32 108:00  109:00  110:00   111: fd
 112: 00  113:32  114:a0  115:1e 116:6f  117:1a   118:00  119:0a
 120: 20  121:20  122:20  123:20 124:20  125:20  126:00  127:8b
```

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DDC Instructions

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There are two chips (IC) to store the serial number of monitor as below.

DDC IC (with EDID data)
OSD IC (EEPROM)

To write the serial number of monitor to DDC IC and OSD IC simultaneously.
Please follow the indications as below.

- Access the factory mode of monitor.
- Execute DDCV2A F0.EXE
- Follow DDC instructions to write serial number to DDC IC and OSD IC.
- Turn off monitor (leave factory mode).
- Press OSD button, select MONITOR STATUS, verify the updated serial number of monitor.

To access factory mode:

- Turn off monitor (don't turn off PC)
- Hold " ◀ " and " ▶ " simultaneously on the front control panel, then press " ⏻ ", wait till the OSD menu with characters " factory mode (below OSD menu)" come on the screen of monitor as shown in Fig. 1 .

- If OSD menu disappears on the screen of monitor, press " OK " again (anytime), then the OSD menu comes on the screen again.
- using " ▲ , ▼ " : to select OSD menu.

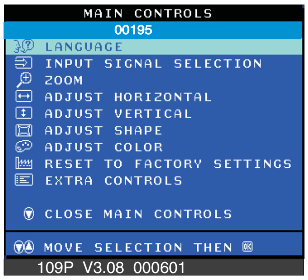
" ◀ , ▶ " : to increase or decrease the setting.

- Using " OK " to confirm the selection.

To leave factory mode

* After alignment of factory mode, turn off monitor (if you do not turn off monitor, the OSD menu is always at the factory mode), then turn on monitor again (at this moment, the OSD menu goes back to user mode).

Fig 1


MAIN CONTROLS
00195
LANGUAGE
INPUT SIGNAL SELECTION
ZOOM
ADJUST HORIZONTAL
ADJUST VERTICAL
ADJUST SHAPE
ADJUST COLOR
RESET TO FACTORY SETTINGS
EXTRA CONTROLS
CLOSE MAIN CONTROLS
MOVE SELECTION THEN OK
109P V3.08 000601

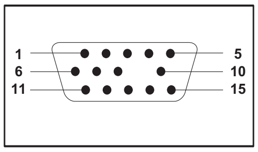
DDC Instructions

This [DDC Module (DDC cable)= 4822 320 12004(=4822 724 27550)] and
[DDC V2(DDCV2A .EXE) software(3.5" disk)=3138 106 10065] are used for "BU Monitor - Chungli product range" which incorporates a DDC1/DDC2B function that allows bi-directional communication between the monitor and PC system for optimal video configuration.
[January 31 2000, Revision 3.3] ,which upgrades the software and service information(4822 727 21027 & 4822 727 21038) , is fully compatible with previous one (DDCV2A F0.EXE).

Additional information :
Additional information about DDC (Display Data Channel) may be obtained from Video Electronics Standards Association (VESA).
Extended Display Identification (EDID) information may be also be obtained from VESA.

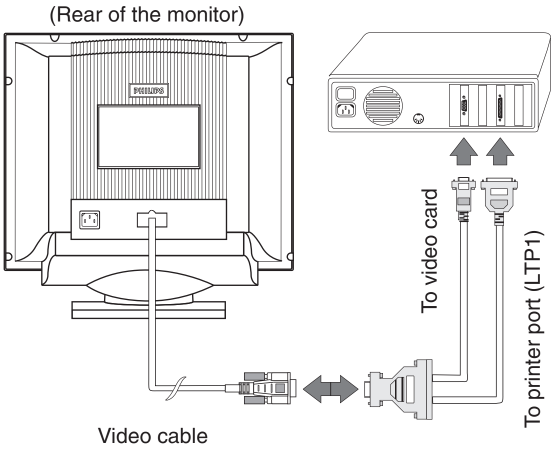
Pin assignment

The 15-pin D-sub connector (male) of the signal cable (3 rows) for DDC feature :



Pin No.	Assignment	Pin No.	Assignment
1	Red video input	9	No pin
2	Green video input	10	Logic ground
3	Blue video input	11	Connected to pin 10
4	Connected to pin 10	12	Serial data line (SDA)
5	Ground	13	H.sync/H+V
6	Red video ground	14	V. sync (VCLK for DDC)
7	Green video ground		
8	Blue video ground	15	Data clock line(SCL)

Connection


(Rear of the monitor)
PHILIPS
To video card
To printer port (LTP1)
Video cable

DDC data re-programming

1. General
   In case the DDC data memory IC, replaced due to a defect the data contents of this IC have to be re- programmed via a PC.
   In case of replacement of the video (or deflection) board it is advised to re-soldered DDC IC from the old board onto the new board, in this case the IC dose not need to be re-programmed.

2. DDCV2A.EXE can be used for :
   EDID Structure Version/Revision

Version	: 1	
Revision	: 0	(text file)

and

Version	: 1	
Revision	: 2	(.hex file)

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DDC Reprogramming Instructions (for PHILIPS models)

System Requirements

DDC Module (DDC cable), P/N = 4822 320 12004
An Intel 386 (or above) PC or compatible
DOS 6.0 or above
DDCV2A.EXE software

Procedure

Connect DDC Cable between PC and Monitor.
Turn on Monitor and PC.
Access Factory Mode of monitor.
Verify Factory Mode by OSD function of monitor.
Insert diskette in Drive a: Select Run "DDCV2A F0(Zero).EXE" under DOS or Win. (hit the space bar once)

Verify the data and version of DDC application software.
It should be : January 31 2000
Revision 3.3

Press "Enter" at the introduction screen

Menu Configuration:

File	R/W	Setup	Quit
Load EDID	Write EDID to EEPROM	Options	
Load txt file (V1.0)	Read From EEPROM	Barcode format	
Save EDID	Edit EDID Code		
Save txt File	Auto Scan		
Convert EDID Code			
Os shell			
Exit			

General :

1. How to change drive

① Use arrow keys to highlight "Options" under the Setup menu, press "Enter".
② Press "F2", then press "ESC", fill in "A" or "C".
[(If your .HEX files for different Model numbers in drive "A", then fill in "A").,
(If your .HEX files for different Model numbers in drive "C", then fill in "C").
Normally, to read DDC data from EEPROM of Monitor is enough.]
③ Press "Enter", then press "ESC"

2. *How to select .HEX files for different Model numbers*
example:

① Use arrow keys to highlight "Load EDID" under the File menu, press "Enter"
② Bring up PHILIPS\ press "Enter"
③ Bring up ..\ 109P2 GSIII ← select, press "Enter"
④ Bring up ..\ at this highlight area, press "Enter", then go back to last screen
00MITS.HEX ←select for 109P20/00(MITS CRT)

How to write DDC hex files to Monitor

① Use arrow keys to highlight "Options" under the Setup menu, press "Enter"

② Tab down to ID Serial Number, use down arrow key to place the asterisk (*) beside "store in DEC with LSB first". Press "control/enter" to save.
(Ensure the top asterisk (*) is beside in store in HEX with LSB first.)

③ Use arrow keys to highlight "Load EDID" under the file menu, press "Enter".

④ Use arrow keys to highlight "PHILIPS\", Press "Enter".

⑤ Use arrow keys to highlight "the model list under subdirect", press "Enter".

⑥ Use arrow keys to highlight "Write EDID to EEPROM" under the R/W menu, press "Enter".

⑦ Use arrow keys to highlight "Read from EEPROM" under the R/W menu, press "Enter".

⑧ Use arrow keys to highlight "Edit EDID Code" under the R/W menu, press "Enter".

⑨ Verify the ID Serial number on the screen matches the serial number of the unit.

⑩ Verify EDID Structure Version is "Version :2, Revision :1

⑪ Press "ESC"

⑫ Use arrow keys to highlight "Quit", Press "Enter".

Menu Configuration:

File	R/W	Setup	Quit
Load EDID	Write EDID to EEPROM	Options	
Load txt file (V1.0)	Read From EEPROM	Barcode format	
Save EDID	Edit EDID Code		
Save txt File	Auto Scan		
Convert EDID Code			
Os shell			
Exit			

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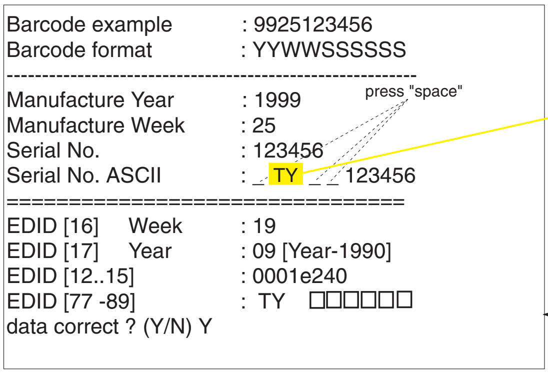
How to change the Year, Week & Serial number of Monitor [for PHILIPS(BRANDED) models]

① Use arrow keys to highlight "Barcode format", under the Setup menu, press "Enter".

② Bring up :
```
Barcode example      : 9925123456     ← Fill in 9925123456, press "Enter"
Barcode format       : YYWWSSSSSS     ← Fill in YYWWSSSSSS, press "Enter"
---------------------------------------------------------
```

③ continued:



```
Barcode example      : 9925123456
Barcode format       : YYWWSSSSSS
--------------------------------------------------------
Manufacture Year     : 1999        press "space"
Manufacture Week     : 25
Serial No.           : 123456
Serial No. ASCII     : _ TY _ _ 123456
===================================
EDID [16]    Week    : 19
EDID [17]    Year    : 09 [Year-1990]
EDID [12..15]        : 0001e240
EDID [77 -89]        : TY  □□□□□□
data correct ? (Y/N) Y
```

← Fill in "Y", don't press "Enter"

Factory code for each site is as below.	
Brazil	H C (48h,43h)
Chungli	T Y (54h,59h)
Delta	G K(47h,4Bh)
Juarez	Y A(59h,41h)
Shenzshen	C X(43h,58h)
Suzhou	BZ (42h,5Ah)
Szombathely	HD (48h,44h)

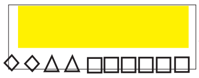
There is a description at the lower of the screen for Barcode format as below.

Barcode format : Y,W,S,X,- (year,week,s/no,ignore,fixed)

Y stands for "year".
W stands for "week".
S stands for "s/no (serial number)".
X stands for "ignore". Allow user to fill in any 'character' or 'numeric'.
- stands for "fixed". User have to fill in Special 'character' or 'numeric' for "AutoScan" if user fill in '-' at "Barcode format :".

④ Use arrow keys to highlight "Auto Scan" under the R/W menu, press "Enter".

⑤ Bring up: Auto Scan

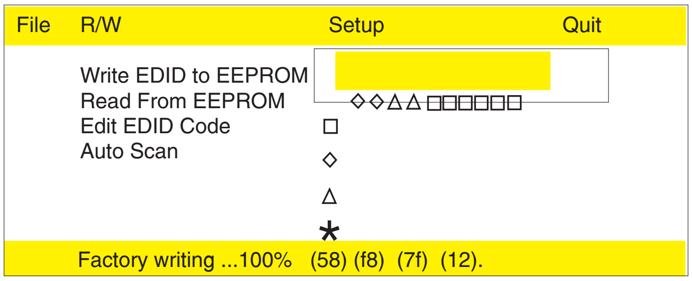


◇◇△△□□□□□□ ← year, week, serial number can be changed.

□ Serial Number
◇ Year Code
△ Week Code
* don't care

(If monitor is not at Factory Mode, access Factory Mode at this moment.)

⑥ Fill in "Barcode data (for instance: 0030123456)" beside AutoScan, press "Enter".
After 10 seconds around, bring up:



```
Write EDID to EEPROM    ◇◇△△□□□□□□
Read From EEPROM
Edit EDID Code          □
Auto Scan               ◇
                        △
                        *
Factory writing ...100%   (58) (f8)  (7f)  (12).
```

⑦ Press "ESC" "ESC", return to R/W menu.

⑧ Select "Edit EDID code", press "Enter".

⑨ Verify "ID Serial No."............

Turn off monitor, then turn on monitor again.

① Press OSD button, select "MONITOR STATUS", press OSD button again.
② Verify "SERIALNO".

(Leave OSD function).

③ Use arrow keys to highlight "QUIT", press "Enter".

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DDC Instructions (Continued)

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How to change the Year, Week & Serial number of Monitor [for PHILIPS(PCEC) models]

① Use arrow keys to highlight "Barcode format", under the Setup menu, press "Enter".

② Bring up :

```
Barcode example      : 003412345678      <- Fill in 993412345678, press "Enter"
Barcode format       : YYWWSSSSSSSS      <- Fill in YYWWSSSSSSSS, press "Enter"
-------------------------------------------------------
```

Factory code for each site is as below.

Brazil	H C (48h,43h)
Chungli	T Y (54h,59h)
Delta	G K(47h,4Bh)
Juarez	Y A(59h,41h)
Shenzshen	C X(43h,58h)
Suzhou	BZ (42h,5Ah)
Szombathely	HD (48h,44h)

③ continued:

```
Barcode example        : 003412345678
Barcode format         : YYWWSSSSSSSS
-------------------------------------------------------
                                     press "space"
Manufacture Year       : 1999
Manufacture Week       : 34
Serial No.             : 12345678
Serial No. ASCII       : _ TY _ _ 12345678
================================
EDID [16]    Week      : 22
EDID [17]    Year      : 09 [Year-1990]
EDID [12..15]          : 00bc614e
EDID [77 -89]          :  TY   □□□□□□
data correct ? (Y/N) Y                       <- Fill in "Y", don't press "Enter"
```

There is a description at the lower of the screen for Barcode format as below.

Barcode format : Y,W,S,X,- (year,week,s/no,ignore,fixed)

Y stands for "year".
W stands for "week".
S stands for "s/no (serial number)".
X stands for "ignore". Allow user to fill in any 'character' or 'numeric'.
- stands for "fixed". User have to fill in Special 'character' or 'numeric' for "AutoScan" if user fill in '-' at "Barcode format :".

④ Use arrow keys to highlight "Auto Scan" under the R/W menu, press "Enter".

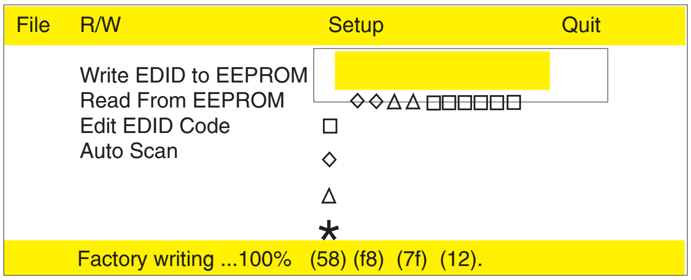
⑤ Bring up: Auto Scan

```
[            ]   <- year, week, serial
◇◇△△□□□□□□           number can be
                      changed.
```

□ Serial Number
◇ Year Code
△ Week Code
* don't care

(If monitor is not at Factory Mode, access Factory Mode at this moment.)

⑥ Fill in "Barcode data (for instance: 003412345678)" beside AutoScan, press "Enter".
After 10 seconds around, bring up:



```
File   R/W                   Setup               Quit

       Write EDID to EEPROM  [            ]
       Read From EEPROM        ◇◇△△□□□□□□
       Edit EDID Code        □
       Auto Scan             ◇
                             △
                             *
   Factory writing ...100%  (58) (f8)  (7f)  (12).
```

⑦ Press "ESC" "ESC", return to R/W menu.

⑧ Select "Edit EDID code", press "Enter".

⑨ Verify "ID Serial No."............

Turn off monitor, then turn on monitor again.

① Press OSD button, select "MONITOR STATUS", press OSD button again.
② Verify "SERIALNO".

(Leave OSD function).

③ Use arrow keys to highlight "QUIT", press "Enter".

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Electrical Adjustments

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0. General

When carry-out the electrical settings in many cases a video signal must be applied to the monitor. A computer with :

- ATI GPT-1600 (4822 397 10065), Mach 64 (up to 107kHz)

are used as the video signal source. The signal patterns are selected from the "service test software" package, see user guide 4822 727 21046 (GPT-1600).
0.1 This monitor has 35 factory-preset modes as below
.
31.469 KHz/70.087 Hz, 640 X 350
31.469 KHz/59.941 Hz, 640 X 480
31.468 KHz/70.084 Hz, 720 X 400
37.5 KHz/75 Hz, 640 X 480
37.861 KHz/72.810 Hz, 640 X 480
37.861 KHz/85.081 Hz, 640 X 350
37.879 KHz/60.317 Hz, 800 X 600
37.927 KHz/85.039 Hz, 720 X 400
43.269 KHz/85.008 Hz, 640 X 480
46.875 KHz/75.000 Hz, 800 X 600
48.077 KHz/72.188 Hz, 800 X 600
48.363 KHz/60.004Hz, 1024X 768
49.722 KHz/74.546Hz, 832 X 624
50.628 KHz/100.10 Hz, 640 X 480
53.674 KHz/85.061 Hz, 800 X 600
56.476 KHz/70.069 Hz,1024X 768
60.000 KHz/60.000 Hz,1280 X 960
60.023KHz/75.029Hz, 1024 X 768
63.923 KHz/100.00 Hz, 800 X 600
63.981KHz/60.020Hz, 1280 X 1024
67.500 KHz/75.00Hz, 1152 X 864
68.677KHz/84.997Hz, 1024 X 768
68.681KHz/74.979Hz, 1152 X 870
71.809KHz/76.15 Hz, 1152 X 900
75.000KHz/60.000 Hz, 1600 X 1200
79.976KHz/75.024 Hz, 1280 X 1024
81.250 KHz/65.000 Hz, 1600 X 1200
83.640 KHz/59.999 Hz, 1792 X 1344
85.938 KHz/85.002 Hz, 1280 X 960
86.333 KHz/59.995 Hz, 1856X 1392
87.500 KHz/70.000 Hz, 1600 X 1200
90.000 KHz/60.000 Hz, 1920 X 1440
91.146 KHz/85.024 Hz, 1280 X 1024
93.750 KHz/75.000Hz, 1600 X 1200
106.250KHz/85.00 Hz, 1600 X 1200
106.270KHz/74.997Hz, 1792 X 1344

0.2 With normal VGA card:
If not using the ATI card during repair or alignment, The service engineer also can use this service test software adapting with normal standard VGA adaptor and using standard VGA mode 640 x 480, 31.5 kHz/60 Hz (only) as signal source.
0.3 AC/DC Measurement:
The measurements for AC waveform and DC figure is based on 640 x 480 31.5 kHz/60 Hz resolution mode with test pattern "gray scale".
Power input: 110V AC

1. B+ supply voltage (3157) 210Vdc

- Apply a video signal in the 1024 x 768 with 68.7 kHz/85Hz mode.
- Select the "cross-hatch" pattern.
- Set the brightness control and the contrast control to the minimum position.
- Pre-set trimming potentiometer 3157(B+) and 3698(EHT) in mid-position.
- Set Vg2 (screen) to fully Counter-clockwise (zero beamcurrent).
- Connect a dc voltmeter between the joint of capacitor 2131 and ground (common ground).
- Set the B+ trimming potentiometer 3157 so that the reading on the dc voltmeter is 210 V +/- 0.5 Vdc.

2. High-voltage EHT (3698)

- Apply a video signal in the 1024 x 768 with 68.7 kHz/85Hz mode.
- Select the "cross-hatch" pattern.
- Set the brightness control and the contrast control to the minimum position.
- Turn off the power.
- Connect a "high-voltage voltmeter" between the high-voltage connection of the picture tube and earth.
- Turn on the power.
- Set the EHT trimming potentiometer 3698 so that the "high-voltage voltmeter" reads 25.0 kV +/- 0.2 kV .

- Turn off the power.
- Remove the "high-voltage voltmeter" from the picture tube.
- Turn on the power again.

3. Monitor the following auxiliary voltages.

SOURCE ACROSS C2362 + 8.0V +/- 0.5VDC.
SOURCE ACROSS C2143 + 5.0V +/- 0.5VDC.
SOURCE ACROSS C2362 +12.0V+/- 0.5VDC.
SOURCE ACROSS C2134 +15.0V +/- 1.0VDC.
SOURCE ACROSS C2137 - 15.5V +/- 1.0VDC.
SOURCE ACROSS D6148"+" 6.3 V+/- 0.5VDC.
SOURCE ACROSS C2131 + 210.0V +/-1.5VDC.
SOURCE ACROSS C2133 + 82.7 V +/-2.0VDC.

4. General conditions for alignment

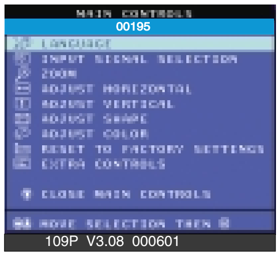
4.1 During all alignments, supply a distortion free AC mains voltage to set via an isolating transformer with low internal impedance.
4.2 Align in pre-warmed condition, at least 30 minutes warm-up with nominal picture brightness.
4.3 Purity, geometry and subsequent alignments should be carried out in magnetic cage with correct magnetic field.

Northern hemisphere : H=0, V=430+/-50 mG, Z=0
Southern hemisphere : H=0, V=-520+/-50 mG, Z=0
Equatorial Support : H=0, V=0 mG, Z=0

4.4 All voltages are to be measured or applied with respect to ground.
Note: Do not use heatsink as ground.
4.5 Adjust function controls " ● ● " to center position except for contrast control which should be set to MAX.

5. To access factory mode:

- Turn off monitor (don’t turn off PC)
- Press " ● " and " ● " simultaneously on the front control panel, then press " ⏻ ",wait till the OSD menu with characters " factory mode (below OSD menu)" come on the screen of monitor.



- If OSD menu disappears on the screen of monitor, press " ■ " again (anytime), then the OSD menu comes on the screen again.
- using " ● ● " : to select OSD menu.
● ● : to increase or decrease the setting.

- Using " ■ " to confirm the selection.

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Electrical Adjustments (Continued)

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6 To leave factory mode

* After alignment of factory mode, turn off monitor (if you do not turn off monitor, the OSD menu is always at the factory mode), then turn on monitor again (at this moment, the OSD menu goes back to user mode).

7. Alignment of Vg2 cut-off point, white tracking (OSD control)

Equipment : 1. Video Test Generator-801GC (Quantum Data)
2. Color-analyzer (Minolta CA-100)

VG2 [(screen), at the bottom of the L.O.T.].

* Apply a video signal in the 1024 x 768 with 68.7 kHz/85 Hz mode, select the "full white pattern" (sizes 355 x 265 mm).
* Use color-analyzer (Minolta CA-100) to adjust cutoff and white uniformity.

OSD R/G/B cut-off and R/G/B gain can be accessed, with initial data:

9300°K
R cutoff = 30%, R gain = 70% (I^2C)
G cutoff = 30%, G gain = 70% (I^2C)
B cutoff = 30%, B gain = 70% (I^2C)

6500°K
R cutoff = 30%, R gain = 70% (I^2C)
G cutoff = 30%, G gain = 70% (I^2C)
B cutoff = 30%, B gain = 70% (I^2C)

5500°K
R cutoff = 30%, R gain = 70% (I^2C)
G cutoff = 30%, G gain = 70% (I^2C)
B cutoff = 30%, B gain = 70% (I^2C)

Brightness = 50%, Sub-Contrast = 90%, ABL = 50% (I^2C)

Step 1: To select the character "FACTORY MODE" as shown in Fig. 2.1, press " ▣ " to access the OSD menu for R/G/B gain & cutoff as shown in Fig. 2.2.
Step 2: Press " ▣ " for function selection as shown in Fig 2.3.
Step 3: Use "◄►" to increase or decrease the value as shown in Fig. 2.3.

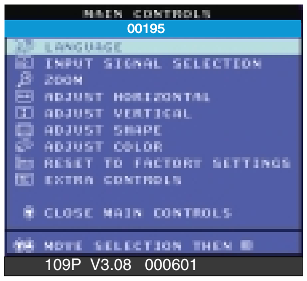

Fig.2.1

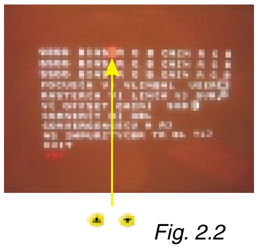

Fig. 2.2

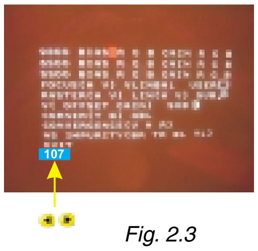

Fig. 2.3

BIAS R G B : R(red) G(green) B(blue) cutoff
GAIN R G B : R(red) G(green) B(blue) gain
V FOCUS : Vertical Focus
H FOCUS : Horizontal Focus
VLIN BAL : Vertical Linearity Balance
USER ⟷ : Horizontal size range
RASTER H: Horizontal raster Shift
RASTER V: Vertical raster Shift
HLIN : Horizontal Linearity
V LIN : Vertical Linearity
SUB 🔍 : Zoom Control range
SUB ◑ : Sub Contrast
V OFFSET : Vertical offset
V GAIN : Vertical Gain
ABL : Auto Beam Limit
T CORNER: Corner Correction of TOP
B CORNER: Corner Correction of BOTTOM
CONVERGENCE(V H R):CONVERGENCE Correction of Vertical , Horizontal,Corner (RESERVED).
NS IMPURITY(BR TR BL TL):NS IMPURITY Correction of BOTTOM RIGHT,TOP RIGHT,BOTTOM LEFT, TOP LEFT.

After pressing " ◄ ► " ,then Press " ▣ "

7.1 Connect the video input, set brightness control at 50% and contrast at minimum position (OSD), Vg2 at Minimum (counter clockwise, and ABL (OSD) at 50% position. Slowly increase Vg2 voltage until light output is at 0.1 Ft-L +/- 0.01Ft-L (Y=0.1 Ft-L, on the screen of CA-100).

7.2 (The screen of monitor is dark now)
: Press " ▣ " to show the OSD menu as shown in Fig. 2.1.
: Select the character "FACTORY MODE" to access the R/G/B adjustment as shown in Fig. 2.2 and Fig. 2.3.
: Adjust the cutoff of R/G/B to get 9300K (x=0.283 +/- 0.015, y=0.297 +/- 0.015), and brightness output at 0.07 +/- 0.01 Ft-L (Y=0.07Ft-L).

7.3 : Press " ◑ " to set contrast at maximum (100%).
: Adjust gain of R/G/B to get 9300K (x=0.283 +/- 0.015, y=0.297 +/-0.015, don't care about the Y value)

7.4 Apply a small white square 10 x 10 cm pattern, brightness set to center (50%), and contrast at maximum (100%), adjust Sub-contrast control (OSD) to reach 32 +/- 2 Ft-L.

7.5 Apply full white pattern at 9300K, adjust ABL (OSD) to reach 32+/- 2 Ft-L (contrast at maximum 100%, brightness at center 50%).

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7.6 : Select the 6500K colour temperature as shown in Fig. 2.2.
: Adjust the R/G/B cutoff and R/G/B gain as shown in procedure 7.2~7.3 to get

R/G/B cutoff	x= 0.313 +/- 0.015 y= 0.329 +/- 0.015
R/G/B gain	x= 0.313 +/- 0.015 y= 0.329 +/- 0.015 Y= 28 +/- 2 Ft-L(Adjust Sub-contrast control (OSD))

7.7 : Select the 5500K colour temperature as shown in Fig. 2.2.
: Adjust the R/G/B cutoff and R/G/B gain as shown in procedure 7.2~7.3 to get

R/G/B cutoff	x= 0.332 +/- 0.015 y= 0.347 +/- 0.015
R/G/B gain	x= 0.332 +/- 0.015 y= 0.347 +/- 0.015 Y= 25 +/- 2 Ft-L(Adjust Sub-contrast control (OSD))

8. Picture geometry setting (factory pre-set modes)

- Apply a video signal with cross-hatch pattern.
- Apply a video signal in the 1024 x 768 with 68.7 kHz/85 Hz mode.
- Set brightness and contrast controls to their center positions (OSD control).

8.1 Horizontal geometry (OSD control)
- Adjust the H-width to 355 mm
- Adjust the H-phase to center position.

8.2 Vertical geometry (OSD control)
- Adjust vertical size to 265 mm
- Adjust V-phase to center position.

8.3 Trapezoid distortion (OSD control)
- Adjust the trapezoid to get optimal vertical lines.

8.4 Pincushion (OSD control)
- Adjust the pincushion to get optimal vertical line.

8.5 Parallelogram (OSD control)
- Adjust parallelogram so that vertical lines are vertical or symmetrically about the center vertical axis.

8.6 Unbalance-pin (OSD control)
- Adjust the unbalance-pin so that that vertical border lines are aligned symmetrically.

8.7 Rotation (OSD control)
- Adjust picture so that vertical tilt is less than +/- 0.5mm.

8.8 Top/Bottom corner(control)
- Adjust the top/bottom corner control to get optimum corner geometry.

8.9 Store the preset results by selecting the "exit" (OSD control).

8.10 Repeat the procedure 8.1 to 8.9 until all the preset timings have been adjusted completely

9. Focus adjustment

: Apply a video signal in the 1024 x 768 with 68.7 kHz/85 Hz mode
: Select " @ " pattern.
: Set the brightness at center (50%) and the contrast to 22 FL.
: Adjust focus potentiometers (top of L.O.T.) Focus 1 for horizontal focus and Focus 2 for vertical focus so that the picture at 2/3 of the diagonal lines (from center to four corners) of the displayed screen is as sharp as possible.

10. Loading DDC code The DDC HEX data should be written into the DDC IC by EEPROM writer or equivalent method.

a: Service DDC Kit
DDC Module (DDC cable), Part number = 4822 320 12004
DDCV2A.EXE software (3.5" disk), Part number = 3138 106 10065
b: Please refer to Service information 4822 727 21027(4822 727 21038) for using the Service DDC Kit.

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Purity and Convergence Adjustments

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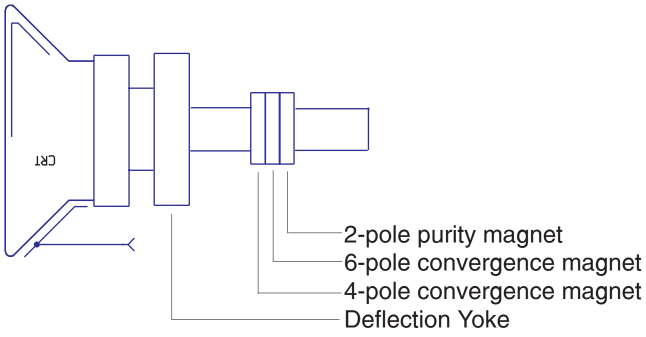
1. Purity adjustment

- Make sure the monitor is not exposed to any external magnetic field.
- Produce a full red pattern on the screen, adjust the purity magnet rings on the PCM assy (on CRT) to obtain a complete field of the color red. This is done by moving the two tabs (2-pole) in such a manner that they advance in an opposite direction but at the same time to obtain the same angle between the two tabs, which should be approximately 180 degree.
- Check by full green pattern and full blue pattern again to observe their respective color purity.



2. Static convergence

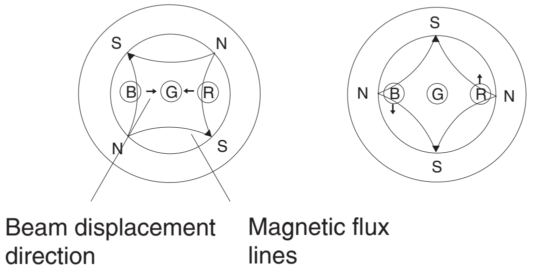
Introduction

Slight deviation in the static convergence can be corrected by using two permanent pairs of magnets which are fitted around the neck of the CRT. These are the 4-pole magnet and the 6-pole magnet. The 4-pole magnet move the outermost electron beams (R and B) parallel in the opposite direction from the other. The 6-pole magnet moves the outermost electron beam (R, B and G) parallel in the opposite direction from the other. The magnetic field of the above magnets do not affect the center of the CRT neck.

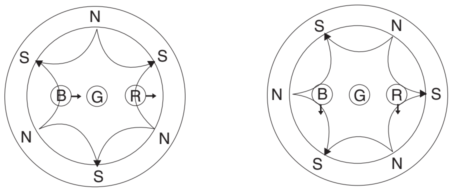
Setting

- Before the static convergence setting can be made, the monitor must be switched on for 30 minutes.
- The focus setting must be made correctly.
- Signal: 640 * 480, 31.5 kHz/60 Hz mode.
- Set the tabs of the 4-pole magnet in the neutral position. This is when the tabs are opposite one another. In this position the magnets do not affect the deflection of the R and B electron beams.
- Set the tabs of the 6-pole magnet in the neutral position. This is when the tabs are opposite one another. In this position the magnets do not affect the deflection of the R, B, and G electron beams.
- First set the 4-pole magnet optimally.
- Then set the 6-pole magnet optimally.
- If the convergence is not now optimal, then adjust to the optimal setting with the 4-pole magnet and then with the 6- Pole magnet again.
- Set the tabs of the 6-pole magnet in the neutral position. This is when the tabs are opposite one another. In this position the magnets do not affect the deflection of the R, B, and G electron beams.
- First set the 4-pole magnet optimally.
- Then set the 6-pole magnet optimally.
- If the convergence is not now optimal, then adjust to the optimal setting with the 4-pole magnet and then with the 6- pole magnet again.

4-pole Beam motion producced by the 4-pole convergence magnet



6-pole Beam motion producced by the 6- pole convergence magnet



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0. Location of the panel
0.1 Main panel (1160)
0.2 Video panel (1162)

1. General
To be able to perform measurements and repairs on the "circuit boards", the monitor should be placed in Service Position (fig. 1) first:

How to remove the back cover of monitor :
There are 2 screws in the lid [1 screw are at the right side of the monitor, The other 1 screw are at the left side of the monitor],to fix the front cabinet and back cover of the monitor.

Step 1: To open the lid at the right-upper side and 1screw in right-downer side of the monitor.(FIG.3)
Step 2: To open the lid at the left-upper side and 1screw in left-downer side of the monitor.(FIG.4)
Step 3: To remove the back cover, you can see FIG.5
Step 4: To remove the16 screws on the metal shield, and remove the metal shield, you can see FIG.6.

Chassis :
- After remove the back cover & metal shield, you can see the inside of the monitor as Fig. 6.
- To remove 16 screws for service position as Fig. 5 to Fig. 8.
- Include remove bottom plate screw, then slide out chassis board and disconnect metal shield.

Video panel :
- After remove the metal frame (Fig. 5), to remove the metal shield on rear side of Video panel for measurement.

Main panel :
After remove the metal frame.
- To cut out cable tie and disconnect "video panel"
- To disconnect EHT cable
- To disconnect ground wire(1703) of video board.
- To disconnect M1311(4pin) to control panel.
- To disconnect M1501(4pin) yoke connector.
- To disconnect M1131(2pin) degaussing coil
- To slide out Main panel as Fig. 1.

Service position :
To get service position as Fig. 1 through Fig. 2 to Fig. 8.

2. Repair instructions
After the service position was obtained, all the panel's copper track side could be accessed.

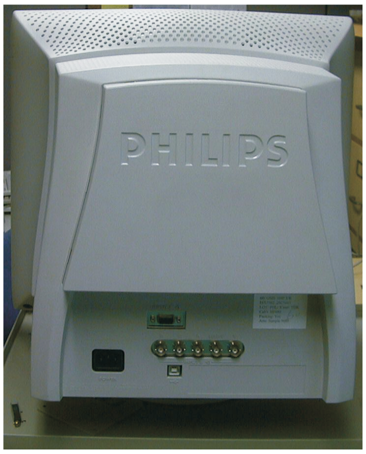

Fig. 2

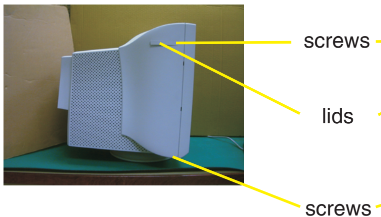

Fig. 3

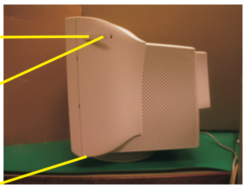

Fig. 4

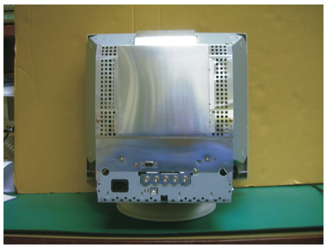

Fig. 5

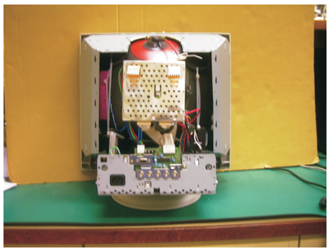

Fig. 6

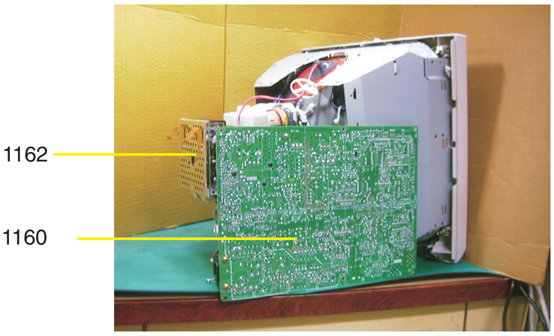

Fig. 1 Service Position

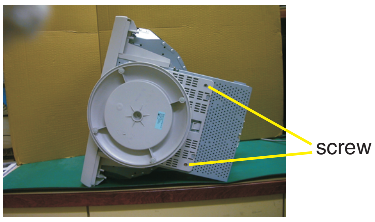

Fig. 7

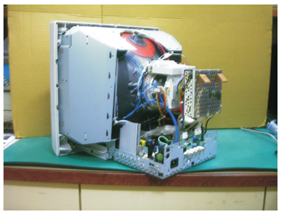

Fig. 8

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Safety test requirements

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All units that are returned for service or repair must pass the original manufactures safety tests. Safety testing requires both **Hipot** and **Ground Continuity** testing.

HI-POT TEST INSTRUCTION

1. Application requirements

1.1 All mains operated products must pass the Hi-Pot test as described in this instruction.

1.2 This test must be performed again after the covers have been refitted following the repair, inspection or modification of the product.

2. Test method

2.1 Connecting conditions

2.1.1 The test specified must be applied between the parallel-blade plug of the mainscord and all accessible metal parts of the product.

2.1.2 Before carrying out the test, reliable conductive connections must be ensured and thereafter be maintained throughout the test period.

2.1.3 The mains switch(es) must be in the "ON" position.

2.2 Test Requirements

All products should be HiPot and Ground Continuity tested as follows:

Condition	HiPot Test for products where the mains input range is Full range(or 220V AC)	HiPot Test for products where the mains input is 110V AC(USA type)	Ground Continuity Test requirement
Test voltage	2820VDC (2000VAC)	1700VDC (1200VAC)	Test current: 25A,AC Test time: 3 seconds(min.) Resistance required: <=0.09+R ohm, R is the resistance of the mains cord.
Test time (min.)	3 seconds	1 second	
Trip current (Tester)	set at 100 uA for Max. limitation; set at 0.1 uA for Min. limitation	5 mA	
Ramp time	set at 2 seconds		

2.2.1 The test with AC voltage is only for production purpose, Service center shall use DC voltage.

2.2.2 The minimum test duration for Quality Control Inspector must be 1 minute.No breakdown during the test.

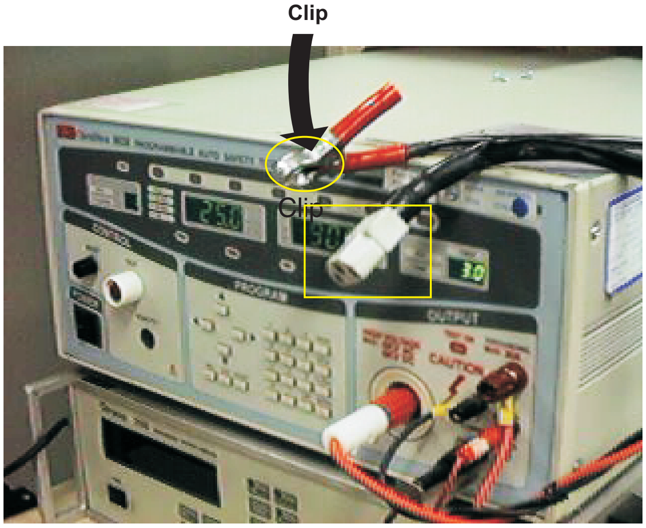
2.2.3 The test voltage must be maintained within the specified voltage + 5%.

2.2.4 The grounding blade or pin of mains plug must be conducted with accessible metal parts.

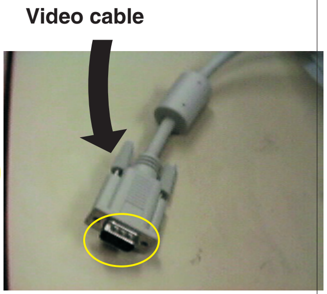
3. Equipments and Connection

3.1. Equipments
For example :
- ChenHwa 9032 PROGRAMMABLE AUTO SAFETY TESTER
- ChenHwa 510B Digital Grounding Continuity Tester
- ChenHwa 901 (AC Hi-pot test), 902 (AC, DC Hi-pot test) Withstanding Tester

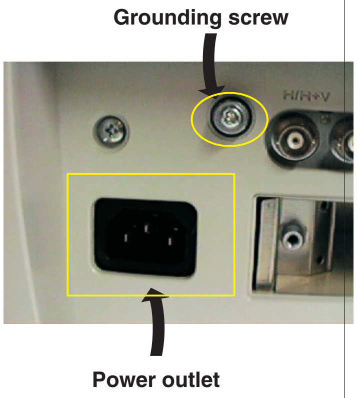
3.2. Connection
* Turn on the power switch of monitor before Hipot and Ground Continuity testing.



(ChenHwa 9032 tester)



Connect the "video cable" or "grounding screw" to the CLIP on your tester.



Connect the power cord to the monitor.

(Rear view of monitor)

4. Recording

Hipot and Ground Continuity testing records have to be kept for a period of 10 years.

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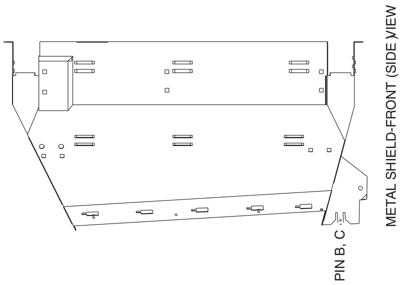
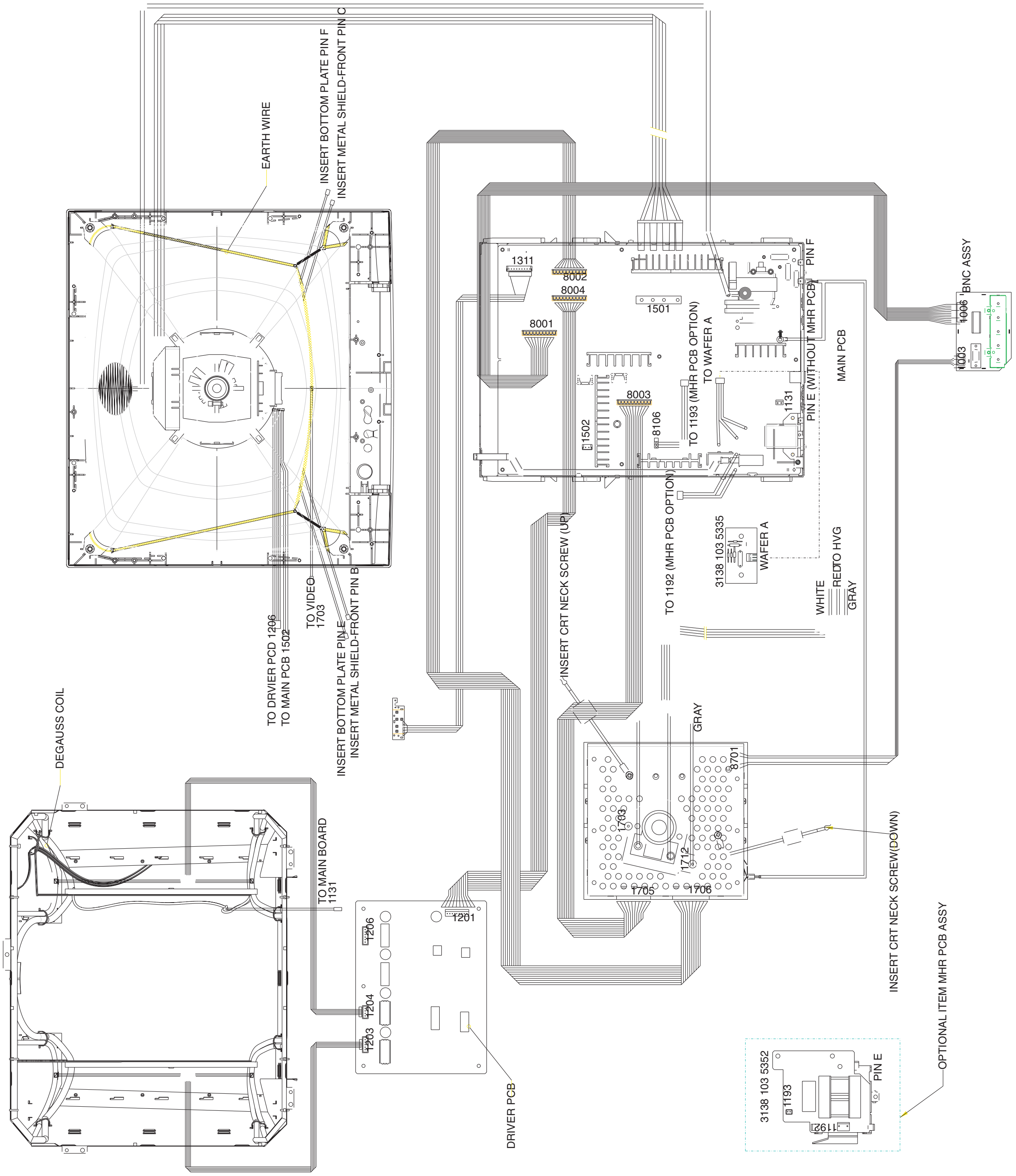
Wiring Diagram


METAL SHIELD-FRONT (SIDE VIEW
PIN B, C


EARTH WIRE
INSERT BOTTOM PLATE PIN F
INSERT METAL SHIELD-FRONT PIN C
1311
8002
8004
8001
1501
8003
1502
8106
TO 1193 (MHR PCB OPTION)
TO WAFER A
1131
PIN F
PIN E (WITHOUT MHR PCB)
MAIN PCB
BNC ASSY
1006
1003
TO 1192 (MHR PCB OPTION)
3138 103 5335
WAFER A
WHITE
RED
TO HVG
GRAY
TO DRVIER PCD 1206
TO MAIN PCB 1502
TO VIDEO
1703
INSERT BOTTOM PLATE PIN E
INSERT METAL SHIELD-FRONT PIN B
INSERT CRT NECK SCREW (UP)
GRAY
8701
1703
1712
1705
1706
INSERT CRT NECK SCREW(DOWN)
DEGAUSS COIL
TO MAIN BOARD
1131
1201
1206
1204
1203
DRIVER PCB
OPTIONAL ITEM MHR PCB ASSY
3138 103 5352
1193
1192
PIN E

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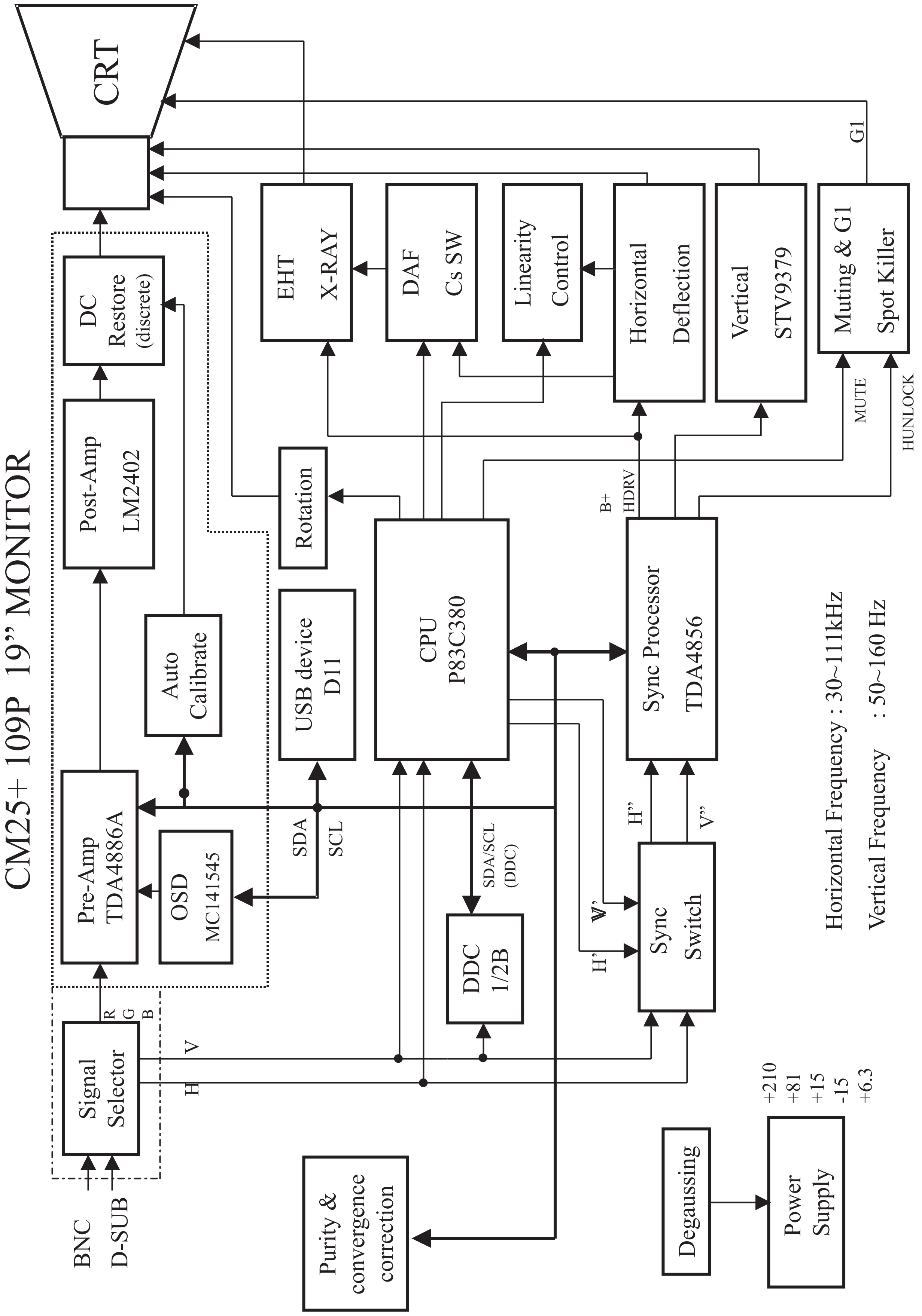
Block Diagram


CM25+ 109P 19" MONITOR
CRT
DC Restore (discrete)
Post-Amp LM2402
Auto Calibrate
Pre-Amp TDA4886A
OSD MC141545
Signal Selector
R
G
B
V
H
BNC
D-SUB
EHT X-RAY
DAF Cs SW
Linearity Control
Horizontal Deflection
Vertical STV9379
Muting & G1 Spot Killer
G1
MUTE
HUNLOCK
Rotation
USB device D11
SDA
SCL
CPU P83C380
SDA/SCL (DDC)
DDC 1/2B
B+
HDRV
Sync Processor TDA4856
H"
V"
V'
H'
Sync Switch
Purity & convergence correction
Degaussing
Power Supply
+210
+81
+15
-15
+6.3
Horizontal Frequency : 30~111kHz
Vertical Frequency : 50~160 Hz

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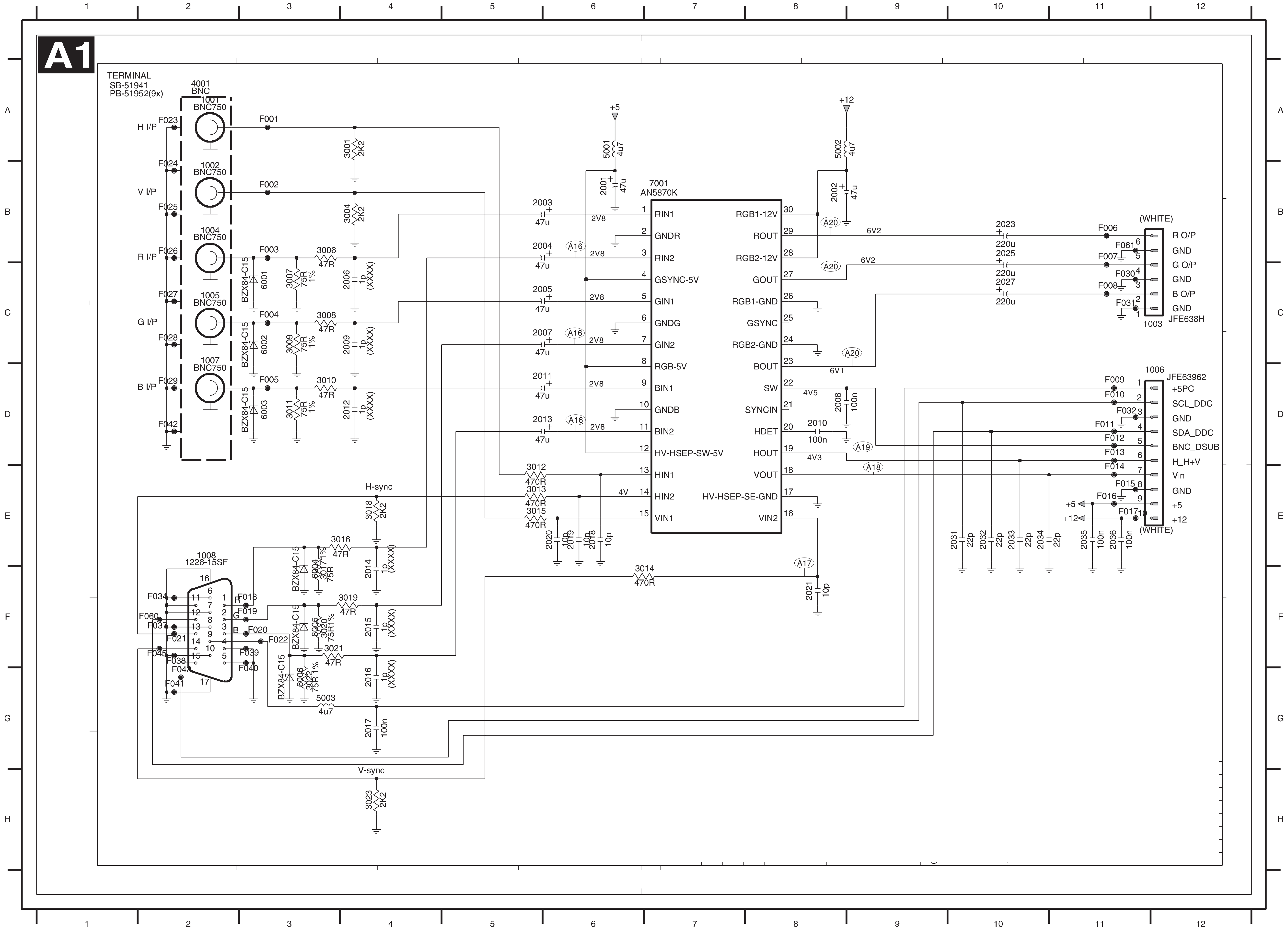
Terminal Schematic Diagram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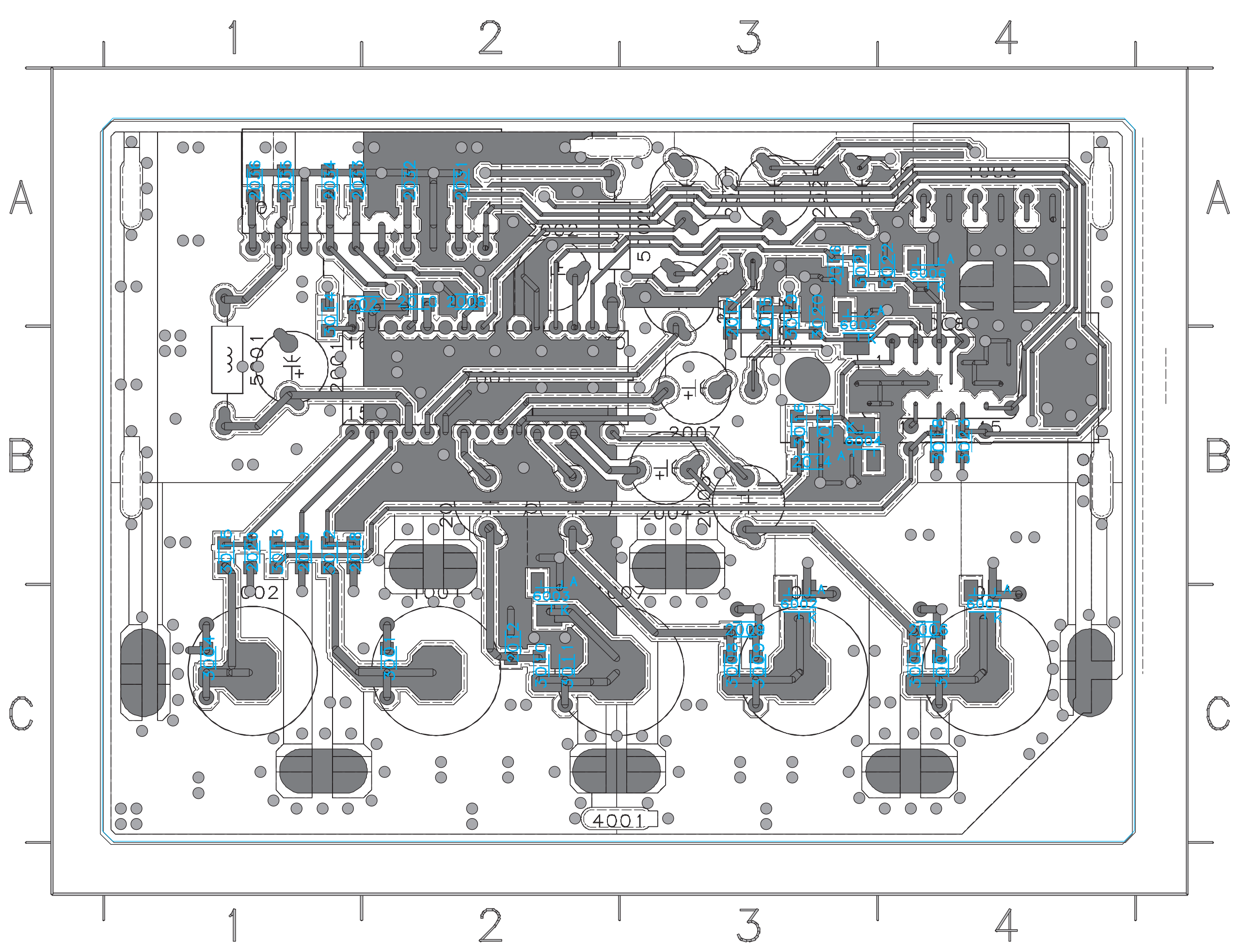
TERMINAL
SB-51941
PB-51952(9x)
4001
BNC
1001 BNC750
1002 BNC750
1004 BNC750
1005 BNC750
1007 BNC750
H I/P
V I/P
R I/P
G I/P
B I/P
F001
F002
F003
F004
F005
3001 2K2
3004 2K2
3006 47R
3008 47R
3010 47R
3007 75R 1%
3009 75R 1%
3011 75R 1%
2006 10 (XXX)
2009 10 (XXX)
2012 10 (XXX)
BZX84-C15
6001
6002
6003
+5
5001 4u7
2001 47u
+12
5002 4u7
2002 47u
7001
AN5870K
RIN1
GNDR
RIN2
GSYNC-5V
GIN1
GNDG
GIN2
RGB-5V
BIN1
GNDB
BIN2
HV-HSEP-SW-5V
HIN1
HIN2
VIN1
RGB1-12V
ROUT
RGB2-12V
GOUT
RGB1-GND
GSYNC
RGB2-GND
BOUT
SW
SYNCIN
HDET
HOUT
VOUT
HV-HSEP-SE-GND
VIN2
2003 47u
2004 47u
2005 47u
2007 47u
2011 47u
2013 47u
2V8
6V2
6V1
4V5
4V3
4V
2023 220u
2025 220u
2027 220u
2008 100n
2010 100n
2021 10p
A16
A17
A18
A19
A20
F006
F007
F008
F061
F030
F031
(WHITE)
R O/P
GND
G O/P
GND
B O/P
GND
1003
JFE638H
1006
JFE63962
F009
F010
F032
F011
F012
F013
F014
F015
F016
F017
+5PC
SCL_DDC
GND
SDA_DDC
BNC_DSUB
H_H+V
Vin
GND
+5
+12
(WHITE)
2031 22p
2032 22p
2033 22p
2034 22p
2035 100n
2036 100n
3012 470R
3013 470R
3015 470R
2020 10p
2019 10p
2018 10p
H-sync
3018 2K2
3016 47R
3019 47R
3021 47R
6004 3017 75R 1%
6005 3020 75R 1%
6006 3022 75R 1%
2014 10 (XXX)
2015 10 (XXX)
2016 10 (XXX)
5003 4u7
2017 100n
3014 470R
1008
1226-15SF
F034
F060
F037
F021
F045
F038
F043
F041
F018
F019
F020
F022
F039
F040
V-sync
3023 2K2
F023
F024
F025
F026
F027
F028
F029
F042
1 2 3 4 5 6 7 8 9 10 11 12
A B C D E F G H

1001	A2
1002	B2
1003	C11
1004	B2
1005	C2
1006	D11
1007	C2
1008	E2
2001	B6
2002	B8
2003	B5
2004	B5
2005	C5
2006	C4
2007	C5
2008	D8
2009	C4
2010	D8
2011	D5
2012	D4
2013	D5
2014	F4
2015	F4
2016	G4
2017	G4
2018	E6
2019	E6
2020	E6
2021	F8
2023	B10
2025	B10
2027	C10
2031	E10
2032	E10
2033	E10
2034	E10
2035	E11
2036	E11
3001	A4
3004	B4
3006	B3
3007	C3
3008	C3
3009	C3
3010	D3
3011	D3
3012	E5
3013	E5
3014	F7
3015	E5
3016	E4
3017	F3
3018	E4
3019	F4
3020	F3
3021	F3
3022	G3
3023	H4
4001	A2
5001	A6
5002	A8
5003	G3
6001	C3
6002	C3
6003	D3
6004	F3
6005	F3
6006	G3
7001	B7
F001	A3
F002	B3
F003	B3
F004	C3
F005	D3
F006	B11
F007	B11
F008	C11
F009	D11
F010	D11
F011	D11
F012	D11
F013	D11
F014	E11
F015	E11
F016	E11
F017	E11
F018	F3
F019	F3
F020	F3
F021	F2
F022	F3
F023	A2
F024	B2
F025	B2
F026	B2
F027	C2
F028	C2
F029	D2
F030	C11
F031	C11
F032	D11
F034	F2
F037	F2
F038	F2
F039	F3
F040	G3
F041	G2
F042	D2
F043	G2
F045	F2
F060	F2
F061	B11

PCB (A1)


1 2 3 4
A B C
4001

1001	C2
1002	C1
1003	A4
1004	C4
1005	C3
1006	A2
1007	C2
1008	A4
2001	B1
2002	A2
2003	B3
2004	B3
2005	B2
2007	B3
2011	B2
2013	A3
2023	A4
2025	A3
2027	A3
4001	C2
5001	B1
5002	A3
5003	A3
7001	B2
2006	C4
2008	A2
2009	C3
2010	A2
2012	C2
2014	B3
2015	A3
2016	A3
2017	A3
2018	B1
2019	B1
2020	B1
2021	A2
2031	A2
2032	A2
2033	A1
2034	A1
2035	A1
2036	A1
3001	C2
3004	C1
3006	C4
3007	C4
3008	C3
3009	C3
3010	C2
3011	C2
3012	B1
3013	B1
3014	A1
3015	B1
3016	B3
3017	B3
3018	B4
3019	A3
3020	A3
3021	A3
3022	A4
3023	B4
6001	C4
6002	C3
6003	C2
6004	B3
6005	A3
6006	A4

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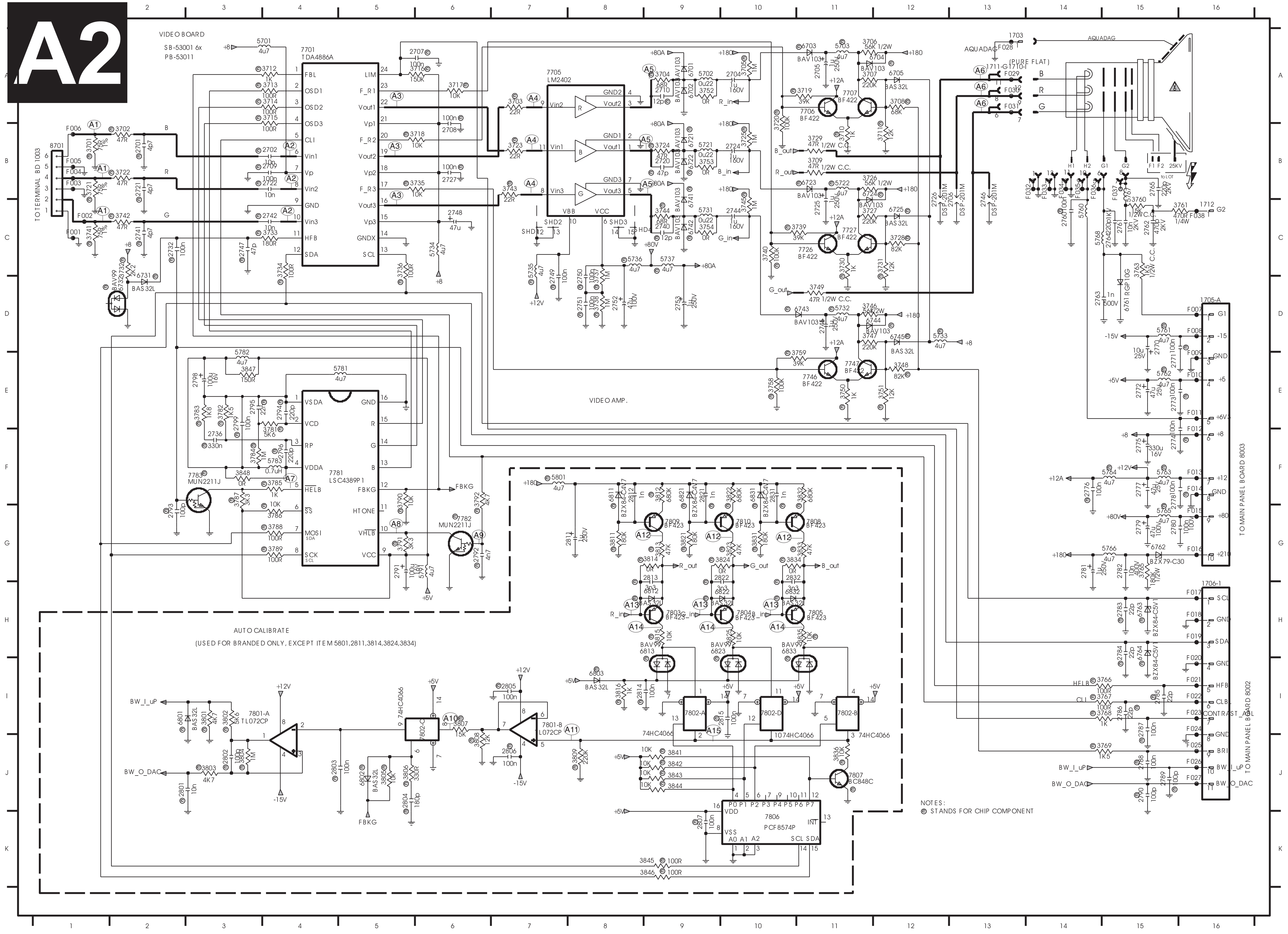
Video Schematic Diagram



1703	A13
1705-A	D16
1706-1	H16
1710-I	A13
1711-G	A13
1712	C16
2701	B2
2702	B4
2704	A10
2705	A11
2706	C13
2707	A6
2708	B6
2709	B4
2710	A9
2720	B9
2721	B2
2722	B4
2724	B10
2725	C11
2726	C12
2727	B6
2732	C2
2736	F3
2740	C9
2741	C2
2742	C4
2744	C10
2745	D11
2746	C13
2747	C3
2748	C6
2749	D7
2750	D8
2751	D8
2752	D8
2753	D9
2760	C14
2761	C15
2762	C15
2763	D14
2764	C15
2765	B15
2770	D15
2771	E15
2772	E15
2773	E15
2774	F15
2775	F15
2776	F14
2777	F15
2778	F15
2779	G15
2780	G15
2781	G14
2782	G15
2783	H15
2784	H15
2785	I15
2786	I15
2787	I15
2788	J15
2789	J15
2790	J15
2791	G5
2792	G6
2793	G2
2794	E4
2795	E3
2796	F4
2798	E3
2799	E3
2801	J2
2802	J3
2803	J4
2804	J5
2805	I7
2806	J7
2807	K9
2811	G8
2812	F8
2813	G9
2814	I8
2815	I10
2821	F9
2822	G10
2831	F10
2832	G10
3701	B1
3702	B2
3703	A7
3704	A9
3705	A10
3706	A11
3707	A11
3708	A12
3709	B11
3710	B11
3711	B12
3712	A4
3713	A4
3714	A4
3715	A4
3716	A6
3717	A6
3718	B6
3719	A11
3720	B10
3721	B1
3722	B2
3723	B7
3724	B9
3725	B10
3726	B11
3727	C11
3728	C12
3729	B11
3730	C11
3731	C12
3732	C2
3733	C4
3734	C4
3735	B6
3736	C5
3737	D8
3738	D8
3739	C11
3740	C10
3741	C1
3742	C2
3743	B7
3744	C9
3745	C10
3746	D11
3747	D11
3748	E12
3749	D11
3750	E11
3751	E12
3752	A9
3753	B9
3754	C9
3758	E10
3759	E11
3760	C15
3761	C16
3763	C15
3765	G15
3766	I15
3767	I15
3768	I15
3769	J15
3781	F4
3782	E3
3783	E3
3784	F3
3785	F4
3786	G4
3787	F3
3788	G4
3789	G4
3790	F5
3791	G5
3792	F6
3801	I3
3802	I3
3803	J3
3804	J3
3805	J5
3806	J5
3807	I6
3808	J6
3809	J8
3811	G8
3812	F9
3813	G9
3814	G9
3815	H9
3816	I8
3821	G9
3822	F10
3823	G10
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3825	H10
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3834	G10
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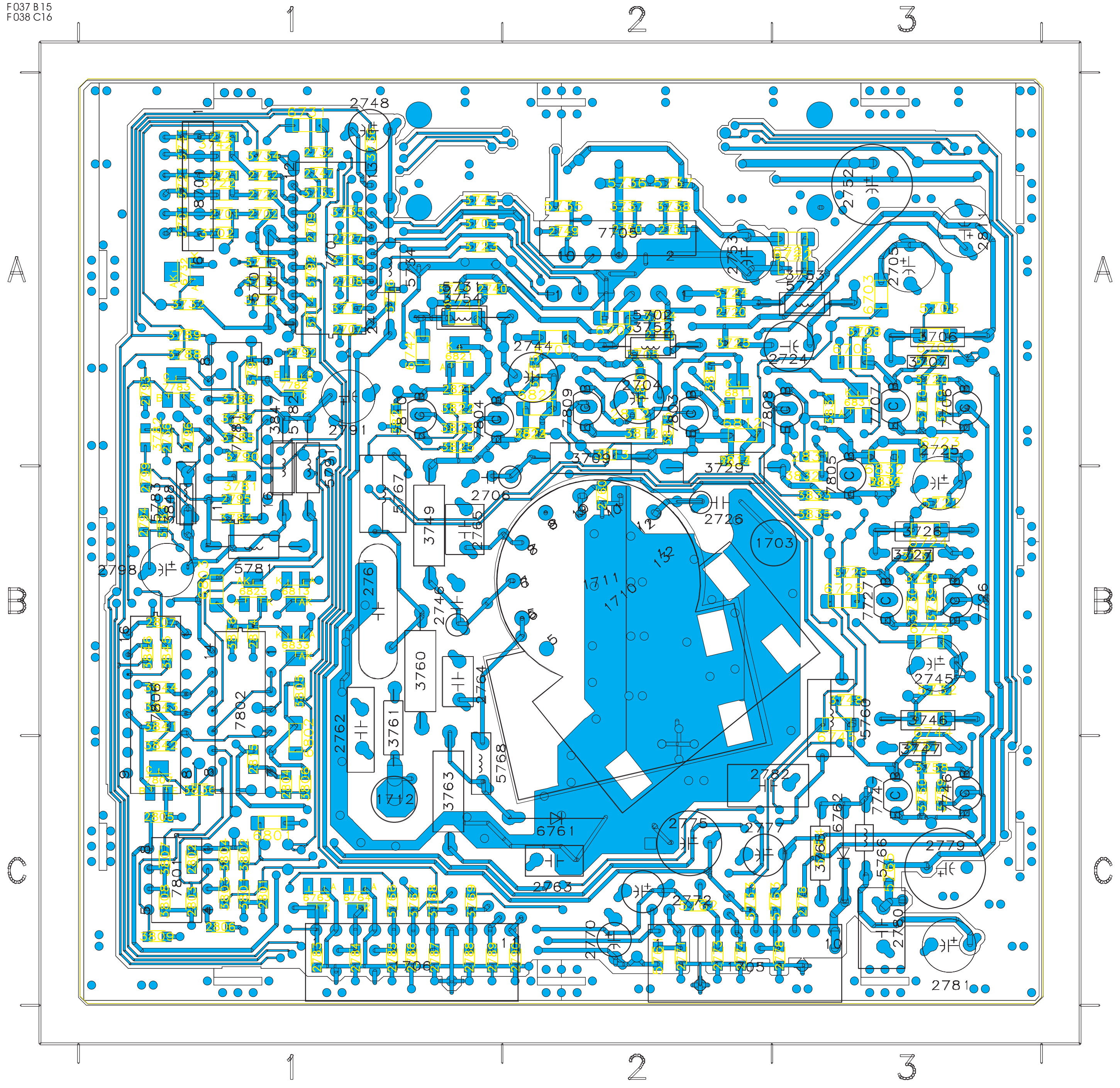

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2775	C2
2777	C2
2779	C3
2780	C3
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2782	C2
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3707	A3
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7802	B1
7803	A2
7804	A1
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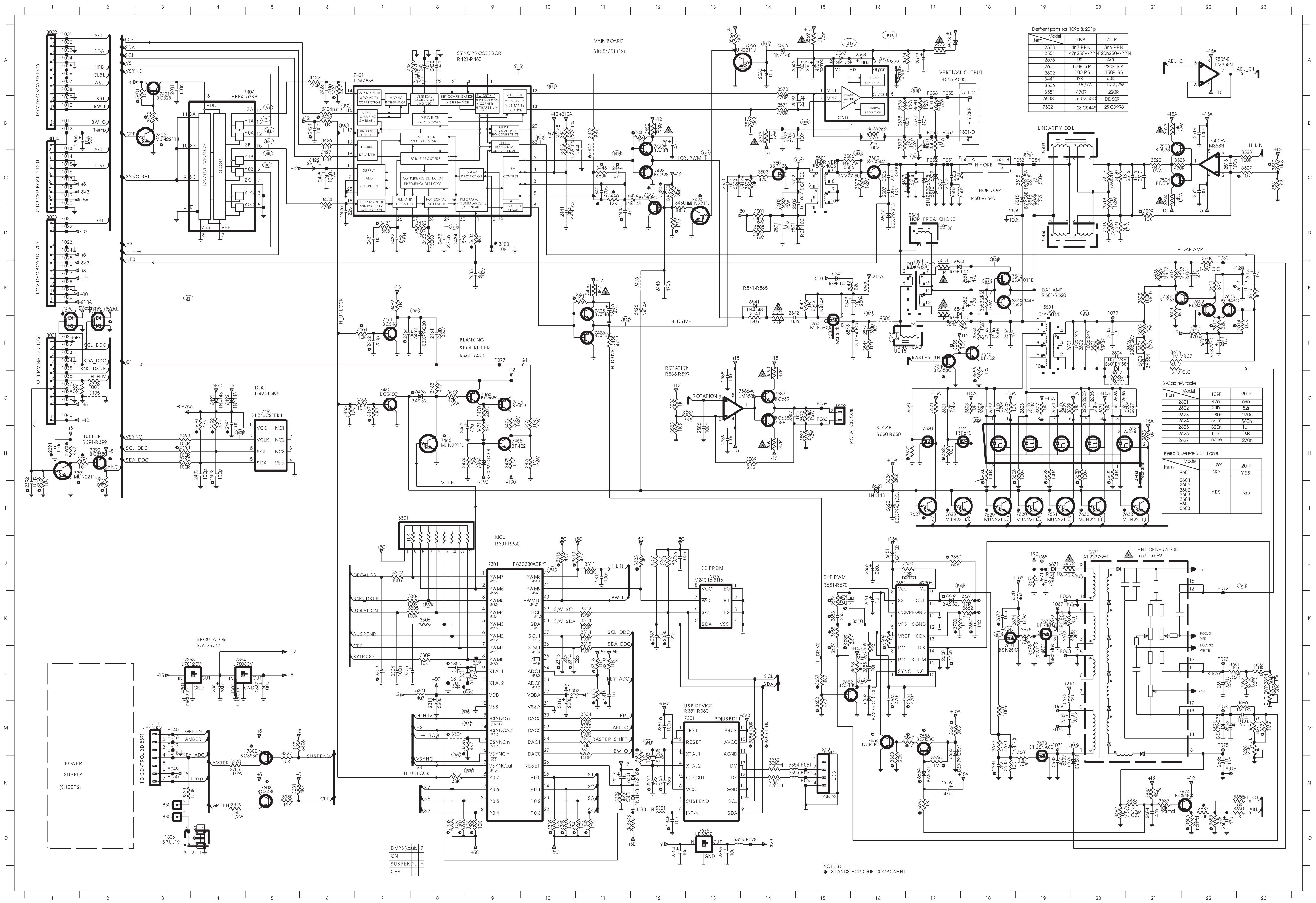
8701	A1

Back

Forward

Deflection Schematic Diagram

B



Deffrent parts for 109p & 201p

Item \ Model	109P	201P
2508	4n7-PPN	3n6-PPN
2554	47n250V-PPN	120n250V-PPN
2576	10n	22n
2601	100P-RR	220P-RR
2602	100-RR	150P-RR
3441	39k	68k
3506	1R8 /7W	1R2 /7W
3581	470R	220R
6508	5TUZ52C	DD50R
7502	2SC5445	2SC3998

S-Cap ref. table

Item \ Model	109P	201P
2621	47n	68n
2622	68n	82n
2623	180n	270n
2624	360n	560n
2625	820n	1u
2626	1u5	1u8
2627	none	270n

Keep & Delete REF.Table

Item \ Model	109P	201P
9601	NO	YES
2604 2605 3602 3603 3604 6601 6603	YES	NO

DMPS(cpu)	6	7
ON	H	H
SUSPEND	L	H
OFF	L	L

NOTES:
● STANDS FOR CHIP COMPONENT

1301	L8
1302	M15
1303	N12
1306	O3
1311	M3
1501-A	C18
1501-B	C18
1501-C	A18
1501-D	B18
1502	G15
2302	L7
2304	L7
2305	L7
2306	B1
2309	L8
2310	L8
2311	M8
2312	J11
2313	L10
2314	L10
2315	L11
2316	M10
2317	N11
2336	J12
2337	K12
2338	K12
2345	O12
2351	M12
2352	N12
2353	N12
2354	O12
2355	O13
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2362	L5
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2392	I1
2401	A3
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2422	A8
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2424	B6
2425	C6
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2431	D7
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2673	K19
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2685	O22
2686	N22
2691	L22
2693	M22
2694	M23
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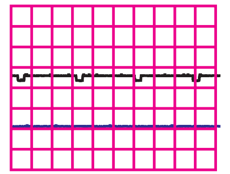
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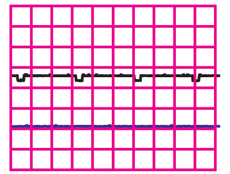
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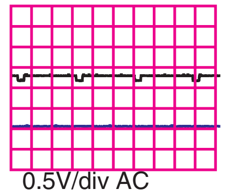
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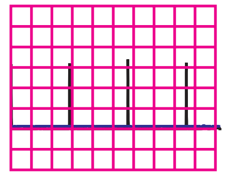
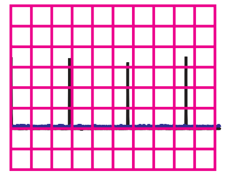
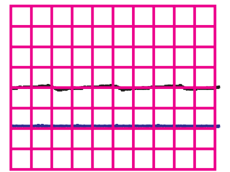
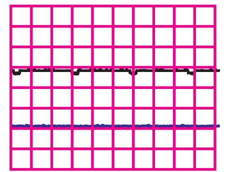
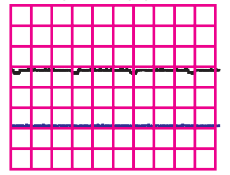
5 mS/div

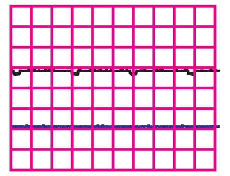
A17 7001-16

0.5 V/div AC
5 mS/div

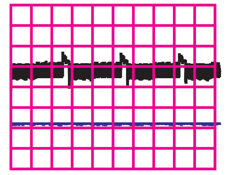
A18 7001-18

0.5V/div AC
5 mS/div

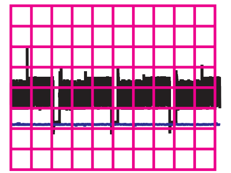
A19 7001-19

1V/div AC
10 uS/div

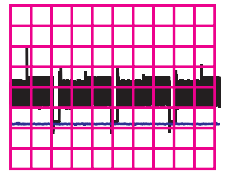
A20 7001-23

1V/div AC
5 mS/div

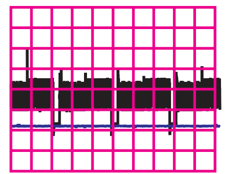
A20 7001-27

1 V/div AC
5 mS/div

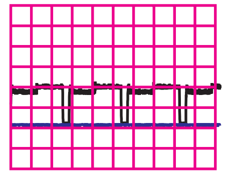
A20 7001-29

1 V/div AC
5 mS/div

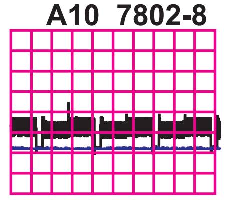
A13 7805-B

10 V/div AC
5 mS/div

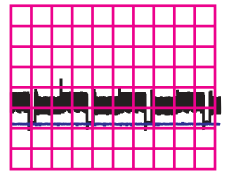
A14 7803-C

1 V/div AC
5 mS/div

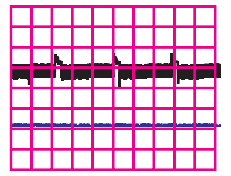
A14 7804-C

1 V/div AC
5 mS/div

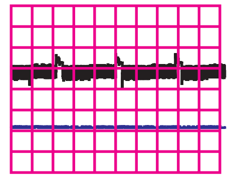
A14 7805-C

1 V/div AC
5 mS/div

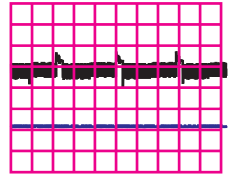
A15 7802-2

0.5 V/div AC
5 mS/div

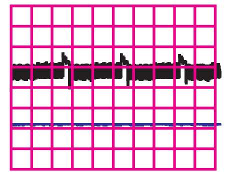
A10 7802-8

1 V/div AC
5 mS/div

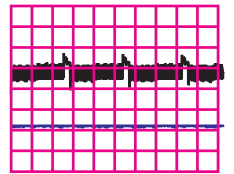
A11 7801-5

1 V/div AC
5 mS/div

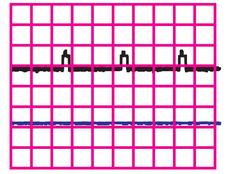
A12 7809-C

10 V/div AC
5 mS/div

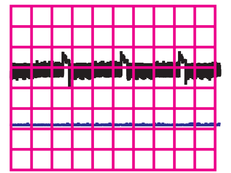
A12 7810-C

10 V/div AC
5 mS/div

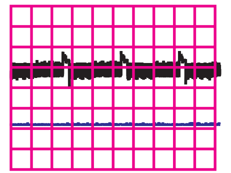
A12 7808-C

10 V/div AC
5 mS/div

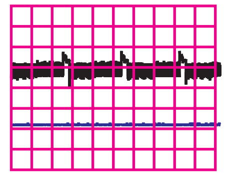
A13 7803-B

10 V/div AC
5 mS/div

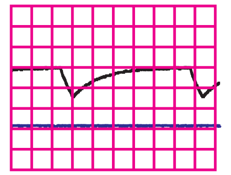
A13 7804-B

10 V/div AC
5 mS/div

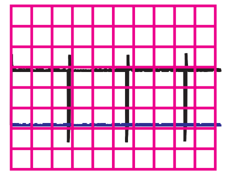
A5 7705-5

5 V/div AC
5 mS/div

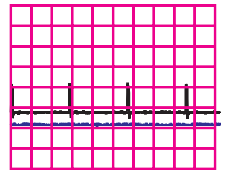
A6 1710-11

10 V/div AC
5 mS/div

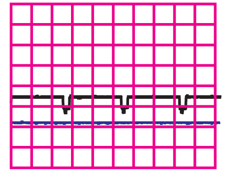
A6 1710-8

10 V/div AC
5 mS/div

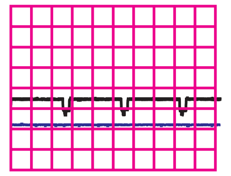
A6 1710-6

10 V/div AC
5 mS/div

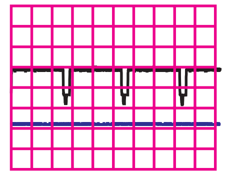
A7 7781-5

1 V/div AC
5 uS/div

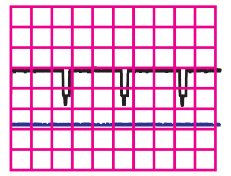
A8 7781-10

1 V/div AC
5 mS/div

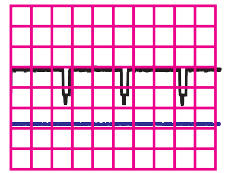
A9 7782-B

0.5 V/div AC
5 mS/div

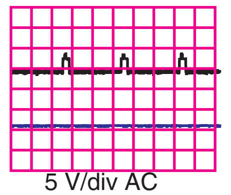
A3 7701-19

1 V/div AC
5 mS/div

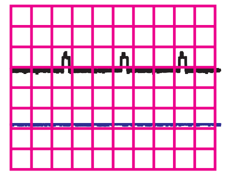
A3 7701-16

1 V/div AC
5 mS/div

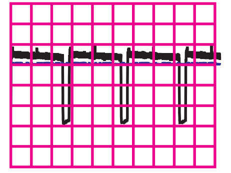
A4 7705-9

0.5 V/div AC
5 mS/div

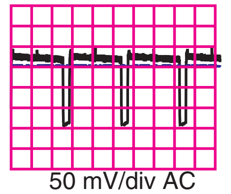
A4 7705-11

0.5 V/div AC
5 mS/div

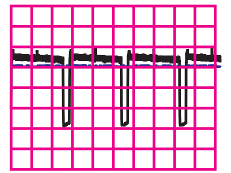
A4 7705-8

0.5 V/div AC
5 mS/div

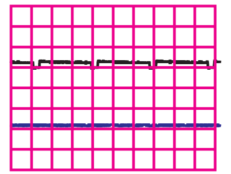
A5 7705-3

5 V/div AC
5 mS/div

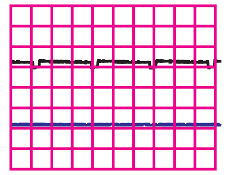
A5 7705-1

5 V/div AC
5 mS/div

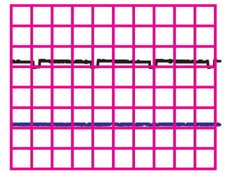
A1 8701-6

50 mV/div AC
5 mS/div

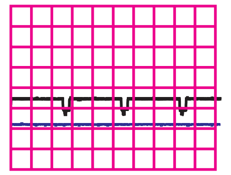
A1 8701-4

50 mV/div AC
5 mS/div

A1 8701-2

50 mV/div AC
5 mS/div

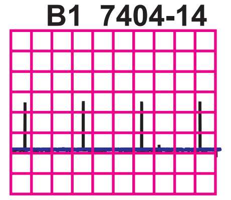
A2 7701-6

0.5 V/div AC
5 mS/div

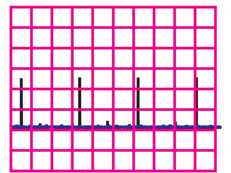
A2 7701-8

0.5 V/div AC
5 mS/div

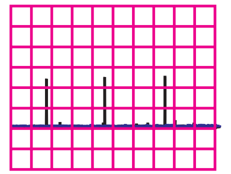
A2 7701-10

0.5 V/div AC
5 mS/div

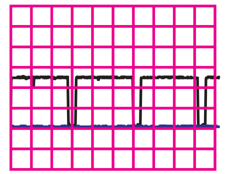
A3 7701-22

1 V/div AC
5 mS/div

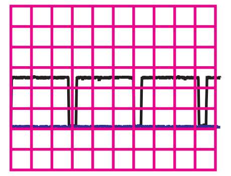
Waveform (B)

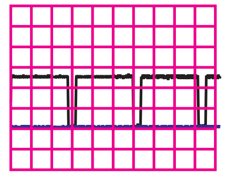
B1 7404-14

2 V/div AC
5 mS/div

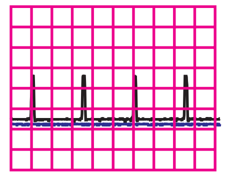
B2 7404-13

2 V/div AC
5 mS/div

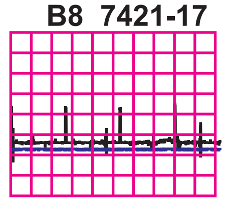
B3 7404-12

2 V/div AC
5 mS/div

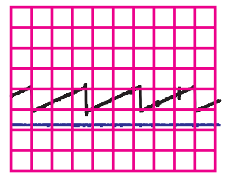
B4 7404-15

0.2 V/div AC
10 uS/div

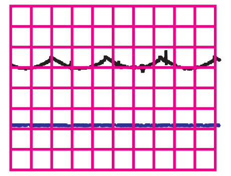
B5 7404-1

0.2 V/div AC
10 uS/div

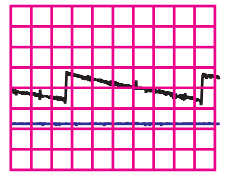
B6 7404-2

0.2 V/div AC
10 uS/div

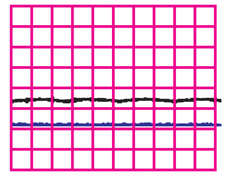
B7 7421-16

2 V/div AC
5 uS/div

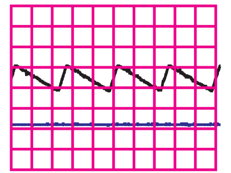
B8 7421-17

0.5 V/div AC
5 mS/div

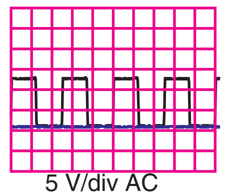
B9 7421-24

2 V/div AC
5 mS/div

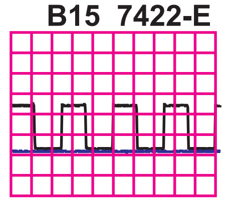
B10 7421-11

1 V/div AC
5 mS/div

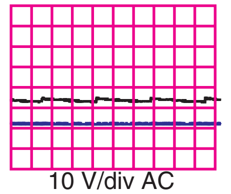
B11 7421-12

0.5 V/div AC
2 mS/div

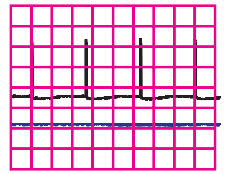
B12 7421-32

5 V/div AC
5 mS/div

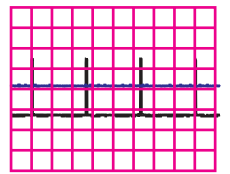
B13 7421-29

2 V/div AC
5 uS/div

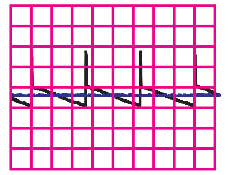
B14 7422-B

5 V/div AC
5 US/div

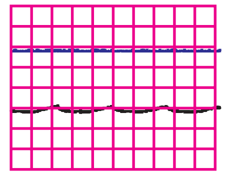
B15 7422-E

5 V/div AC
5 uS/div

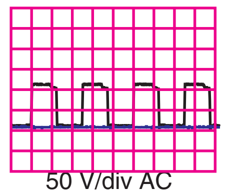
B16 7566-B

10 V/div AC
5 mS/div

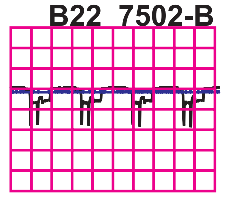
B17 7567-6

10 V/div AC
5 mS/div

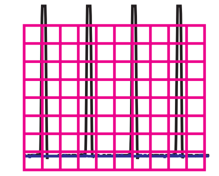
B18 7567-3

10 V/div AC
5 mS/div

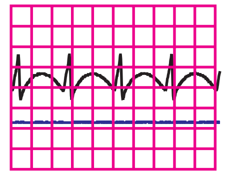
B19 7567-5

20 V/div AC
5 mS/div

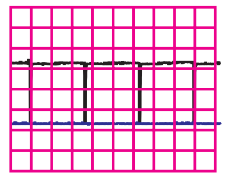
B20 7567-4

5 V/div AC
5 mS/div

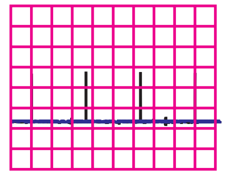
B21 5501-5

50 V/div AC
5 uS/div

B22 7502-B

5 V/div AC
5 uS/div

B23 7502-C

100 V/div AC
5 uS/div

B24 5503-5

50 V/div AC
5 uS/div

B25 7461-C

5 V/div AC
5 mS/div

B26 7491-7

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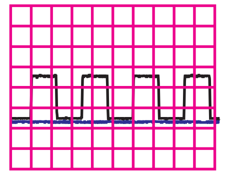
5 mS/div

B27 7425-E

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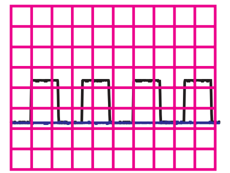
B28 7541-D

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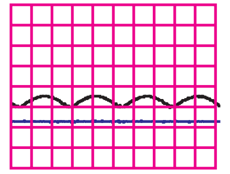
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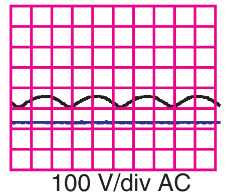
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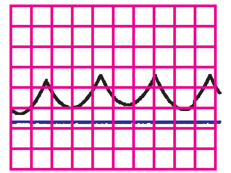
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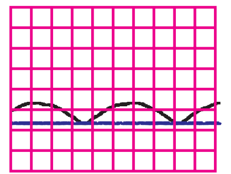
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5 uS/div

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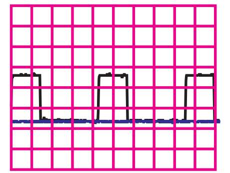
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20 uS/div

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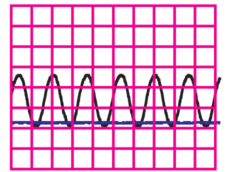
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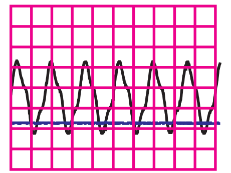
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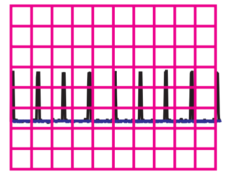
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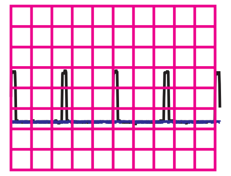
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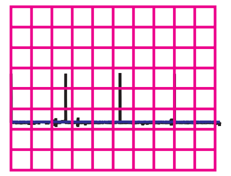
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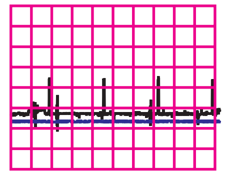
5 mS/div

B39 7301-18

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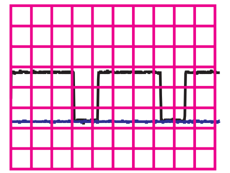
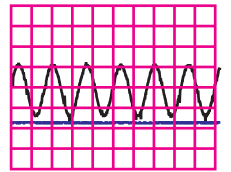

2 V/div AC
20 uS/div

B41 7351-3

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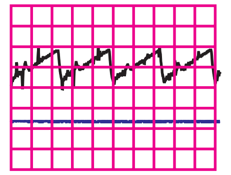
B42 7651-2

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5 uS/div

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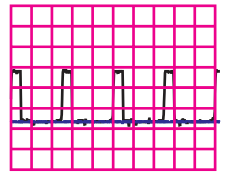
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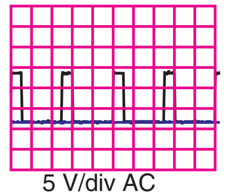
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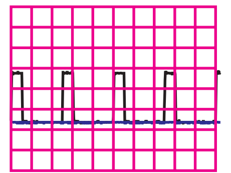
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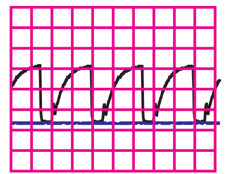
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5 uS/div

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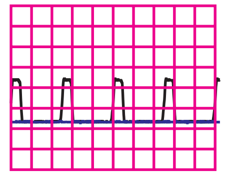
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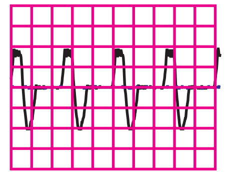
B48 5671-9

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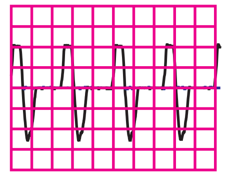
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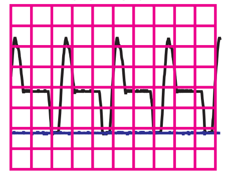
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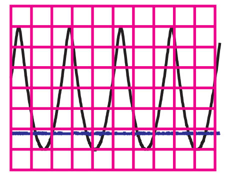
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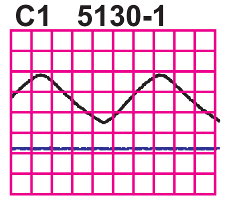
5 uS/div

Waveform (C)

C1 5130-1

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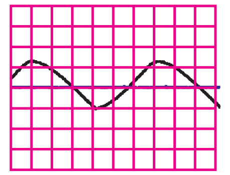
2 uS/div

C2 5130-3

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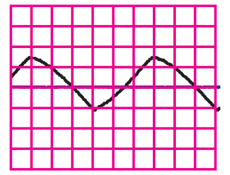
2 uS/div

C3 5130-5

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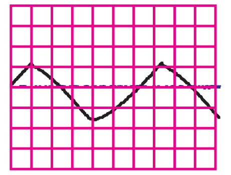
C4 5130-5

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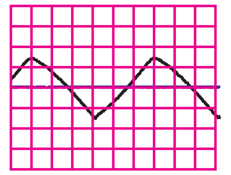
2 uS/div

C5 5130-9

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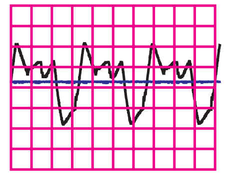
2 uS/div

C6 5130-18

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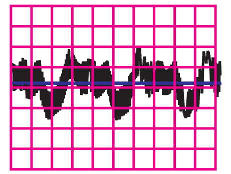
5 mS/div

C7 5130-18

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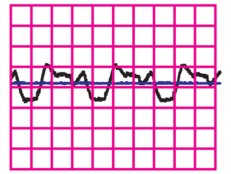
5 mS/div

C8 5130-12

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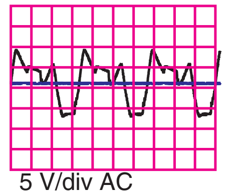
5 mS/div

C9 7111-B

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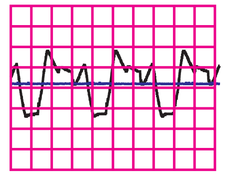
5 mS/div

C10 7163-B

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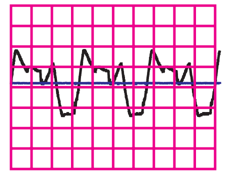
5 mS/div

C11 7130-4

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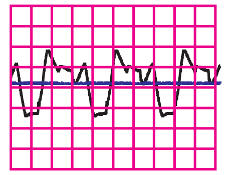
5 mS/div

C12 7130-3

5 V/div AC
5 mS/div

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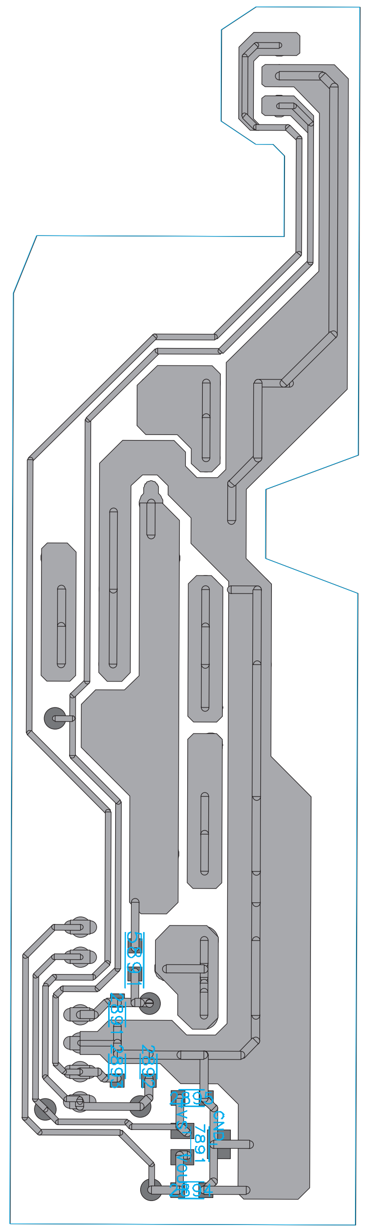
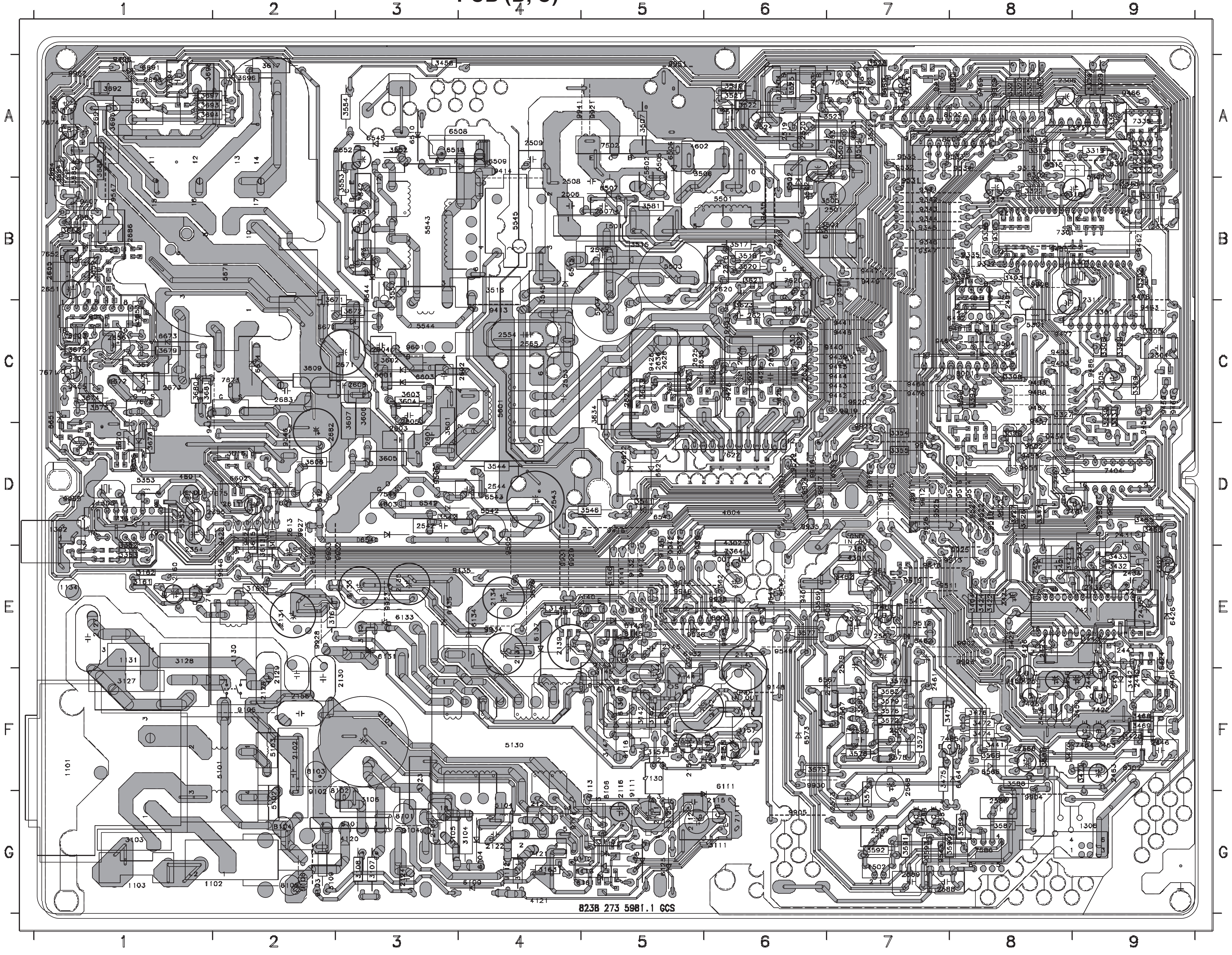
PCB (B, C)





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2422	E8	3142	F5	3552	A3	5544	C3	7541	D3	9455	B8	9952	A1	3318	B8	7627	B6
2423	E8	3145	F5	3553	B3	5545	B4	7542	B3	9456	D9	9955	D1	3323	A9	7628	C6
2425	E8	3146	E5	3554	A3	5601	C4	7543	B3	9457	C8			3324	B8	7629	C6
2426	E8	3147	F5	3566	F8	5670	D1	7545	A7	9458	D8			3325	B8	7630	C6
2431	D9	3152	F5	3569	E6	5671	B2	7567	F7	9459	C9			3332	B8	7631	C5
2432	E9	3154	F5	3570	F7	5672	D2	7586	G8	9460	C9			3333	A9	7632	C5
2433	E9	3157	F6	3571	F7	6101	G3	7587	G7	9461	C7			3339	B8	7633	C5
2434	E9	3160	E2	3572	F7	6104	G4	7588	G7	9462	B9			3340	B8	7653	D1
2435	E9	3161	E1	3573	F6	6109	G4	7601	D2	9463	C9			3341	B8	7654	C1
2440	F9	3162	E1	3574	G7	6111	F6	7620	B6	9464	C7			3342	B8		
2441	E9	3163	G4	3576	F7	6112	G5	7621	C6	9466	A9			3351	D1		
2445	F9	3167	E2	3577	E6	6113	G5	7622	D6	9469	A8			3393	D8		
2446	F9	3301	C9	3578	F7	6115	G5	7651	C1	9476	C7			3394	D8		
2456	F8	3302	B9	3579	F7	6116	F5	7652	B1	9477	C8			3395	D8		
2461	F7	3304	C9	3580	F7	6125	G5	7671	C1	9478	B9			3396	D8		
2463	F9	3305	C9	3581	B5	6131	E3	7672	C1	9486	C9			3401	D8		
2491	B8	3306	C9	3582	F7	6132	E5	7673	C2	9487	C8			3402	D8		
2501	B7	3309	C9	3586	F8	6133	E3	7674	A1	9488	C8			3403	E9		
2502	A7	3311	B9	3587	G8	6134	E4	7675	D2	9491	C8			3405	C8		
2503	A7	3312	A9	3588	F8	6135	E3	8001	C8	9493	C8			3423	E8		
2506	B4	3313	A9	3589	G8	6137	E4	8002	A8	9501	C8			3425	E7		
2507	B5	3314	A8	3590	G8	6139	F5	8003	E6	9502	D8			3429	F9		
2508	B4	3315	A8	3591	G7	6140	E5	8004	A8	9504	C8			3430	F9		
2509	A4	3317	D8	3592	G7	6144	F5	8101	G3	9505	E4			3431	E9		
2515	B5	3319	A9	3593	G7	6145	E5	8102	F3	9506	D3			3434	E9		
2516	B6	3320	A8	3594	B7	6152	F5	8103	F2	9508	D9			3444	E9		
2517	A6	3321	A8	3601	D3	6161	G5	8104	G2	9509	D9			3445	E9		
2518	A7	3322	B8	3602	C3	6302	A8	8105	G2	9511	E7			3446	E9		
2519	A6	3326	D8	3603	C3	6421	F9	8106	F5	9512	E7			3451	F9		
2520	A6	3327	C8	3604	C3	6422	E8	8301	A9	9513	E8			3457	F8		
2542	D3	3328	A9	3605	D3	6424	E9	8302	F9	9514	D8			3464	E7		
2543	D4	3329	A9	3606	C3	6426	E9	9101	E5	9515	D8			3467	D9		
2544	D4	3330	C9	3607	C3	6462	E7	9102	G2	9516	D8			3491	B8		
2551	B3	3331	C9	3608	D2	6464	F8	9103	G2	9517	D8			3492	B8		
2552	A3	3334	A8	3609	C2	6491	C8	9104	G3	9518	E7			3494	B8		
2553	C4	3335	A8	3611	D2	6492	C8	9105	F2	9519	E7			3527	A7		
2554	C4	3337	A9	3613	E2	6501	B6	9106	G2	9521	D8			3529	A6		
2555	C4	3338	A9	3615	D2	6502	B6	9111	F5	9522	D8			3530	A7		
2566	F8	3343	B9	3616	D2	6503	A7	9112	G4	9523	D8			3555	A7		
2567	E7	3352	D1	3617	A2	6506	A5	9113	F5	9525	D7			3556	A7		
2568	F7	3353	E1	3621	B6	6507	B5	9114	G4	9526	D7			3610	B1		
2569	F7	3354	D7	3623	C6	6508	A4	9131	E5	9529	D6			3612	D2		
2573	G7	3355	D7	3625	C6	6509	A4	9132	E5	9531	B7			3614	D2		
2576	F7	3397	C8	3627	C6	6510	A3	9133	D7	9532	A7			3618	F5		
2577	E7	3398	C8	3629	C6	6515	B4	9135	E4	9533	A8			3620	B6		
2578	F7	3404	E8	3631	C5	6518	A3	9141	E5	9534	A8			3622	C6		

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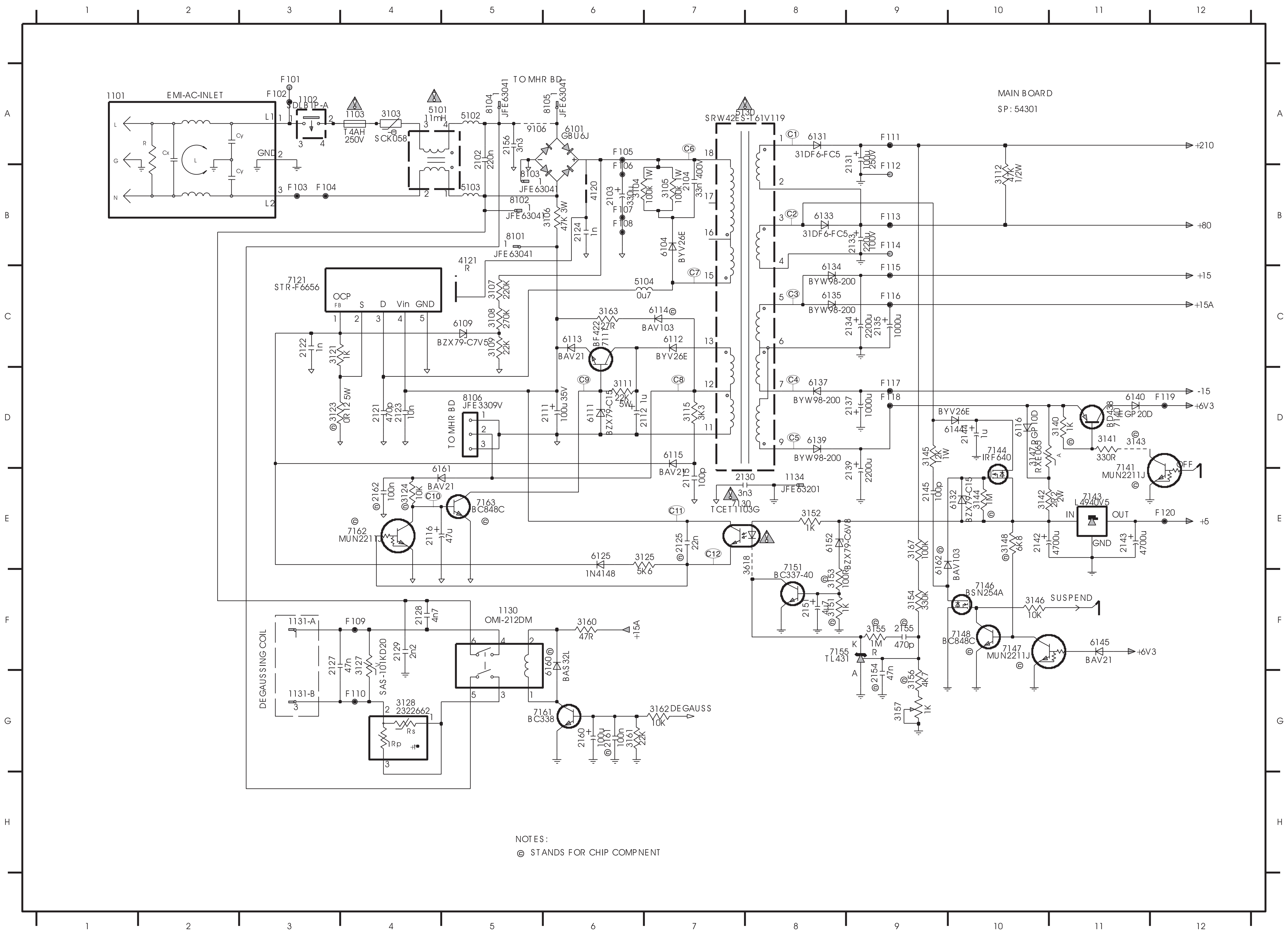
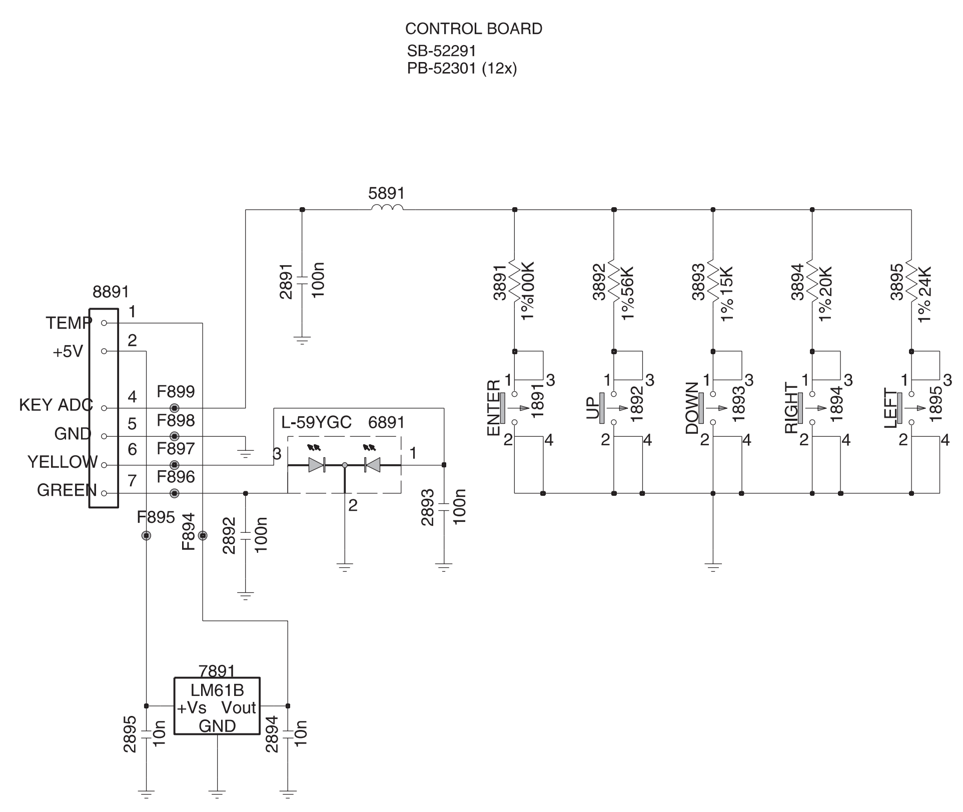
Power Supply Schematic Diagram


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
1101
EMI-AC-INLET
L
G
N
R
Cx
L
Cy
Cy
GND 2
L1 1
L2
3
F101
F102
1102
SDLB1P-A
1
2
3
4
1103
T4AH
250V
3103
SCK058
5101
11mH
3
4
2
1
5102
5103
8104
JFE63041
TO MHR BD
8105
JFE63041
2156
3n3
9106
2102
220n
6101
GBU6J
8103
JFE63041
8102
JFE63041
8101
JFE63041
3106
47K 3W
4120
2124
1n
F103
F104
F105
F106
F107
F108
2103
330u
3104
100k 1W
3105
100k 1W
2104
33n 400V
6104
BYV26E
C6
C7
5104
0u7
4121
R
7121
STR-F6656
OCP
FB
S
D
Vin
GND
1
2
3
4
5
3107
220K
3108
270K
3109
22K
6109
BZX79-C7V5
2122
1n
3121
1K
3123
0R12 5W
2121
470p
2123
10n
8106
JFE3309V
TO MHR BD
1
2
3
2111
100u 35V
3163
27R
6114
BAV103
6113
BAV21
7111
BF422
6112
BYV26E
C9
C8
3111
22K
5W
6111
BZX79-C15
2112
1u
3115
3K3
6115
BAV21
2115
100p
6161
BAV21
2162
100n
3124
10K
C10
7163
BC848C
7162
MUN2211J
2116
47u
6125
1N4148
3125
5K6
2125
22n
C11
C12
5130
SRW42ES-T61V119
18
17
16
15
13
12
11
1
2
3
4
5
6
7
9
C1
C2
C3
C4
C5
6131
31DF6-FC5
2131
100u 250V
F111
F112
6133
31DF6-FC5
2133
220u 100V
F113
F114
6134
BYW98-200
6135
BYW98-200
F115
F116
2134
2200u
2135
1000u
6137
BYW98-200
F117
F118
2137
1000u
6139
BYW98-200
2139
2200u
2130
3n3
7130
TCET1103G
1134
JFE63201
MAIN BOARD
SP: 54301
3112
47K
1/2W
+210
+80
+15
+15A
-15
+6V3
+5
BYV26E
6144
2144
1u
7144
IRF640
3145
12K 1W
2145
100p
6116
RGP10D
3147
RXE065
A
3140
1K
7140
BD438
6140
EGP 20D
F119
3141
330R
3143
7141
MUN2211J
OFF
3142
2R2 2W
7143
L4940V5
IN
OUT
GND
2142
4700u
2143
4700u
F120
6132
BZX79-C15
3144
1M
3148
6K8
3152
1K
6152
BZX79-C6V8
3618
7151
BC337-40
2151
4u7
3153
100R
3151
1K
3167
100K
6162
BAV103
3154
330K
7146
BSN254A
3146
10K
SUSPEND
1
3155
1M
2155
470p
7155
TL431
K
R
A
2154
47n
3156
4K7
3157
1K
7148
BC848C
7147
MUN2211J
6145
BAV21
+6V3
DEGAUSSING COIL
1131-A
1131-B
1
3
F109
F110
2127
47n
3127
SAS-101KD20
2128
4n7
2129
2n2
3128
2322662
Rs
Rp
1
2
3
1130
OMI-212DM
6
4
2
5
3
1
3160
47R
+15A
6160
BAS32L
7161
BC338
2160
100u
2161
100n
3161
22K
3162
10K
DEGAUSS

NOTES:
© STANDS FOR CHIP COMPNENT

1101	A1
1102	A3
1103	A4
1130	F5
1131-A	F3
1131-B	G3
1134	E8
2102	A5
2103	B6
2104	B7
2111	D6
2112	D7
2115	E7
2116	E4
2121	D4
2122	C3
2123	D4
2124	B6
2125	E7
2127	F3
2128	F4
2129	F4
2130	E7
2131	A9
2133	B9
2134	C9
2135	C9
2137	D9
2139	E9
2142	E10
2143	E11
2144	D10
2145	E9
2151	F8
2154	G9
2155	F9
2156	A5
2160	G6
2161	G6
2162	E4
3103	A4
3104	B6
3105	B7
3106	B6
3107	C5
3108	C5
3109	C5
3111	D6
3112	B10
3115	D7
3121	C3
3123	D3
3124	E4
3125	E7
3127	F4
3128	G4
3140	D11
3141	D11
3142	E10
3143	D11
3144	E10
3145	D9
3146	F10
3147	D10
3148	E10
3151	F8
3152	E8
3153	F8
3154	F9
3155	F9
3156	G9
3157	G9
3160	F6
3161	G6
3162	G7
3163	C6
3167	E9
3168	E8
4120	B6
4121	B5
5101	A4
5102	A5
5103	B5
5104	C6
5130	A7
6101	A6
6104	B7
6109	C5
6111	D6
6112	C7
6113	C6
6114	C7
6115	D7
6116	D10
6125	E6
6131	A8
6132	E10
6133	B8
6134	C8
6135	C8
6137	D8
6139	D8
6140	D11
6144	D10
6145	F11
6152	E8
6160	F6
6161	E5
6162	E9
7111	C6
7121	C3
7130	E8
7140	D11
7141	E11
7143	E11
7144	D10
7146	F10
7147	F10
7148	F10
7151	F8
7155	F8
7161	G6
7162	E4
7163	E5
8101	B5
8102	B5
8103	B5
8104	A5
8105	A6
8106	D5
9106	A5
F101	A3
F102	A3
F103	B3
F104	B3
F105	A6
F106	B6
F107	B6
F108	B6
F109	F4
F110	G4
F111	A9
F112	B9
F113	B9
F114	B9
F115	C9
F116	C9
F117	D9
F118	D9
F119	D12
F120	E12

Control panel


CONTROL BOARD
SB-52291
PB-52301 (12x)
5891
2891
100n
3891
1% 100K
3892
1% 56K
3893
1% 15K
3894
1% 20K
3895
1% 24K
8891
TEMP
+5V
KEY ADC
GND
YELLOW
GREEN
1
2
4
5
6
7
F899
F898
F897
F896
F895
F894
L-59YGC
6891
3
2
1
2892
100n
2893
100n
ENTER
1891
UP
1892
DOWN
1893
RIGHT
1894
LEFT
1895
1
3
2
4
7891
LM61B
+Vs
Vout
GND
2895
10n
2894
10n

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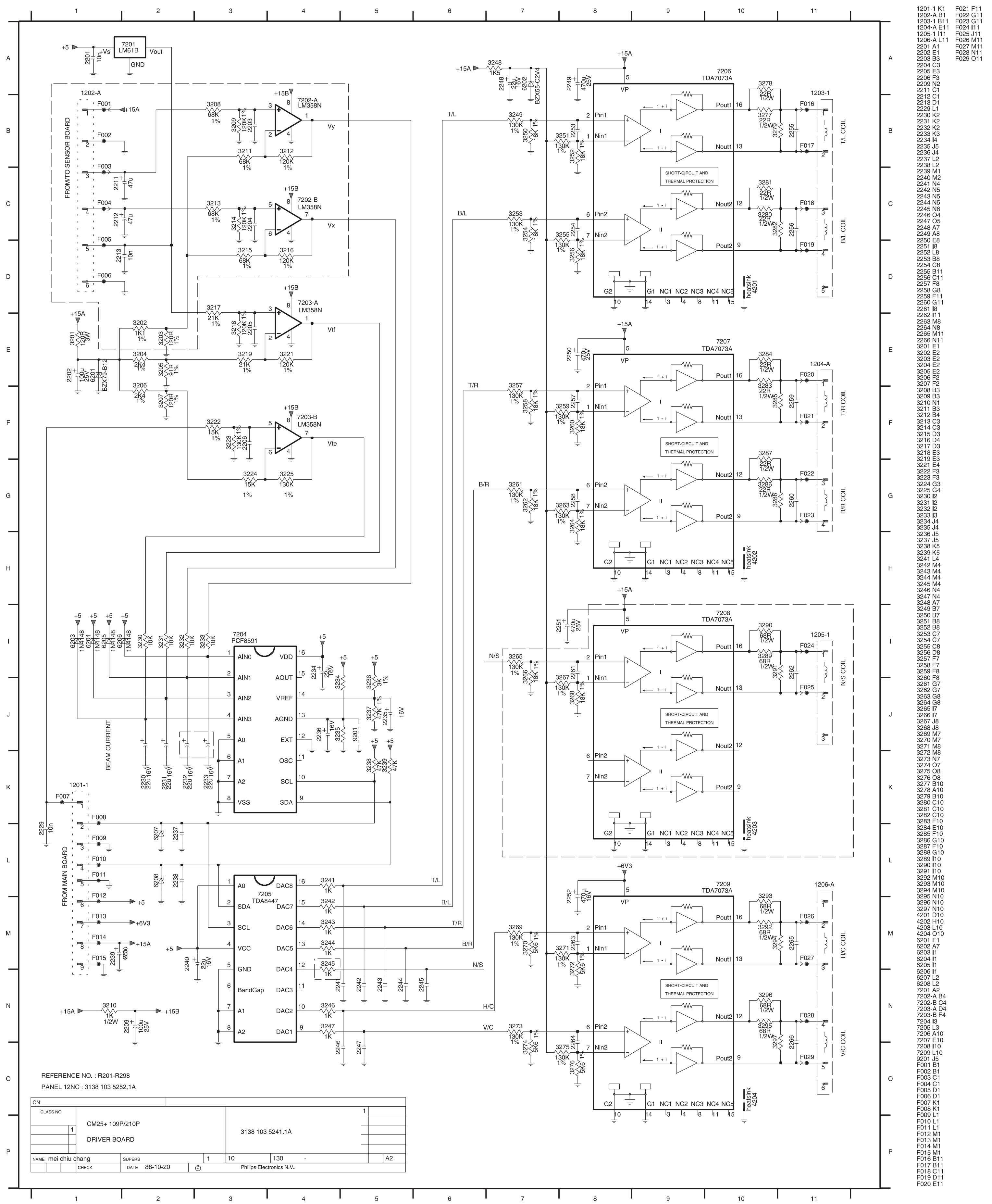
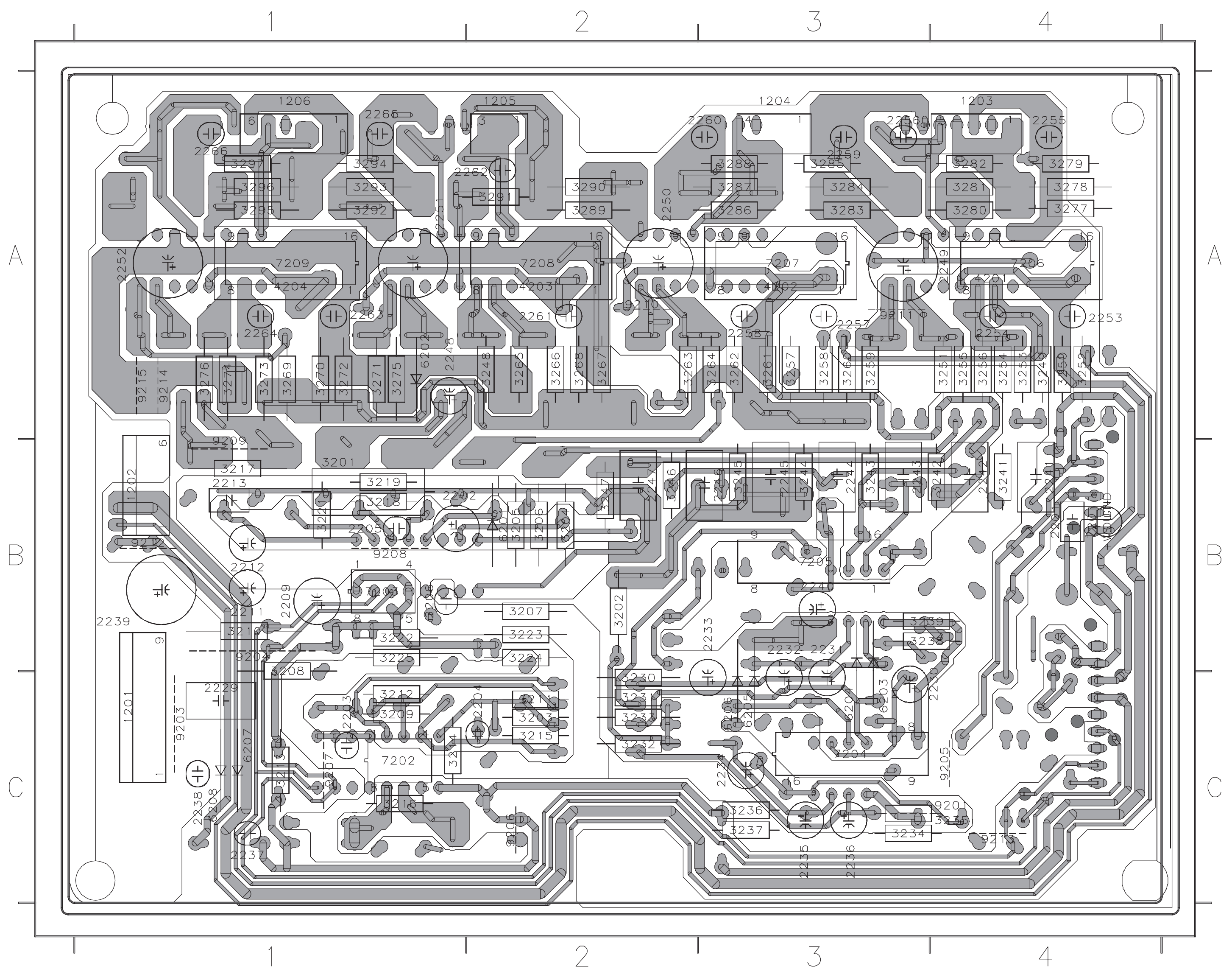
D

Driver Schematic Diagram



PCB(D)



1201	C1	2263	A1	3253	A4	6202	A1
1202	B1	2264	A1	3254	A4	6203	C3
1203	A4	2265	A1	3255	A4	6204	C3
1204	A3	2266	A1	3256	A4	6205	C3
1205	A2	3201	B1	3257	A3	6206	C3
1206	A1	3202	B2	3258	A3	6207	C1
2201	B4	3203	C2	3259	A3	6208	C1
2202	B1	3204	B2	3260	A3	7201	B4
2203	C1	3205	B2	3261	A3	7202	C1
2204	C2	3206	B2	3262	A3	7203	B1
2205	B1	3207	B2	3263	A2	7204	C3
2206	B1	3208	B1	3264	A3	7205	B3
2209	B1	3209	C1	3265	A2	7206	A4
2211	B1	3210	B1	3266	A2	7207	A3
2212	B1	3211	C2	3267	A2	7208	A2
2213	B1	3212	C1	3268	A2	7209	A1
2229	C1	3213	C1	3269	A1	9201	C4
2230	C4	3214	C1	3270	A1	9203	C1
2231	B3	3215	C2	3271	A1	9204	B1
2232	B3	3216	C1	3272	A1	9205	C4
2233	B3	3217	B1	3273	A1	9206	C2
2234	C3	3218	B1	3274	A1	9207	C1
2235	C3	3219	B1	3275	A1	9208	B1
2236	C3	3221	B1	3276	A1	9209	B1
2237	C1	3222	B1	3277	A4	9210	A2
2238	C1	3223	B2	3278	A4	9211	A3
2239	B1	3224	B2	3279	A4	9212	B1
2240	B3	3225	B1	3280	A4	9213	C4
2241	B4	3230	C2	3281	A4	9214	A1
2242	B4	3231	C2	3282	A4	9215	A1
2243	B3	3232	C2	3283	A3		
2244	B3	3233	C2	3284	A3		
2245	B3	3234	C3	3285	A3		
2246	B3	3235	C4	3286	A3		
2247	B2	3236	C3	3287	A3		
2248	A1	3237	C3	3288	A3		
2249	A4	3238	B3	3289	A2		
2250	A2	3239	B3	3290	A2		
2251	A1	3241	B4	3291	A2		
2252	A1	3242	B4	3292	A1		
2253	A4	3243	B3	3293	A1		
2254	A4	3244	B3	3294	A1		
2255	A4	3245	B3	3295	A1		
2256	A3	3246	B2	3296	A1		
2257	A3	3247	B2	3297	A1		
2258	A3	3248	A2	4201	A4		
2259	A3	3249	A4	4202	A3		
2260	A3	3250	A4	4203	A2		
2261	A2	3251	A4	4204	A1		
2262	A2	3252	A4	6201	B2		

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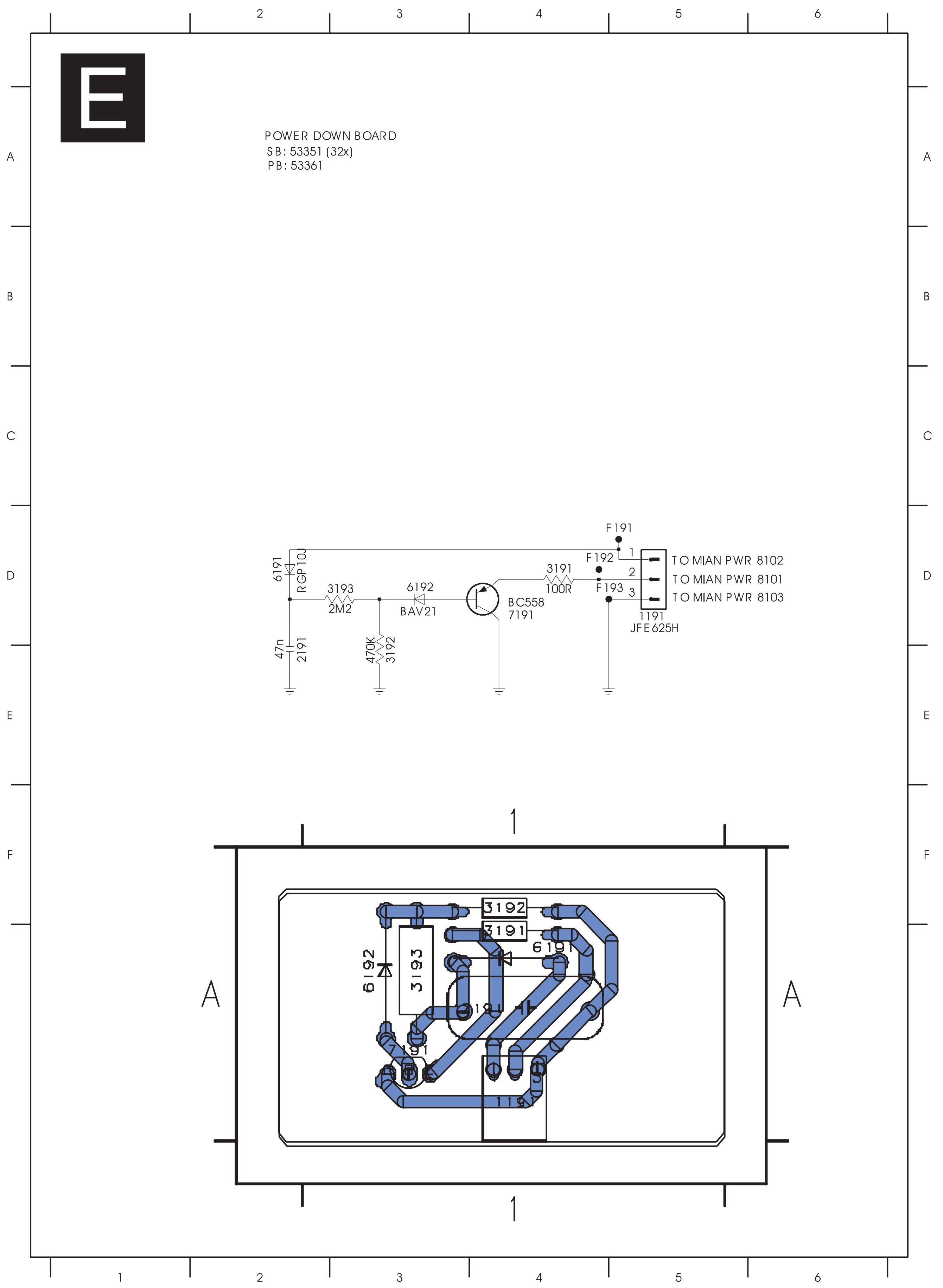
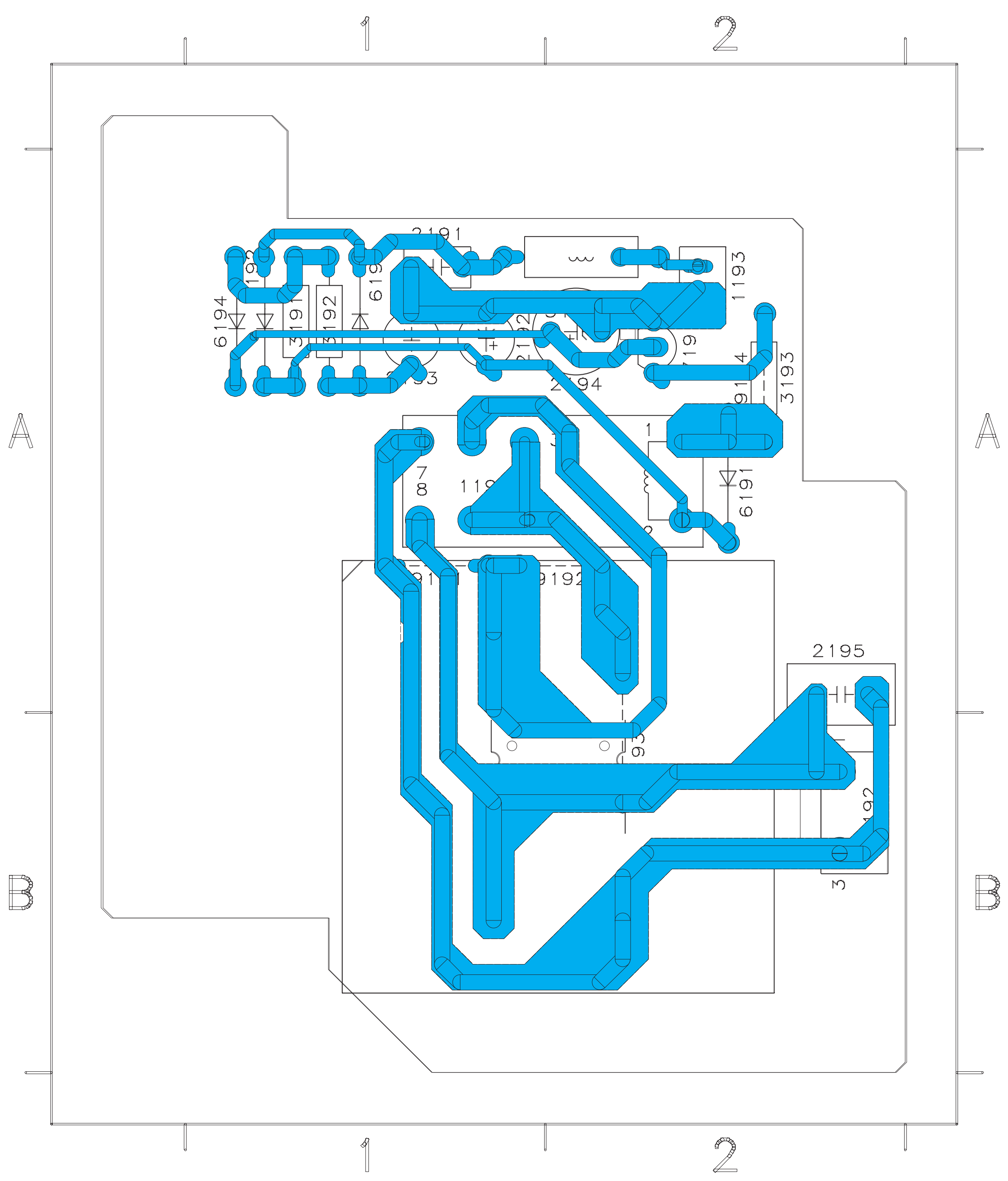
Power Down Diagram

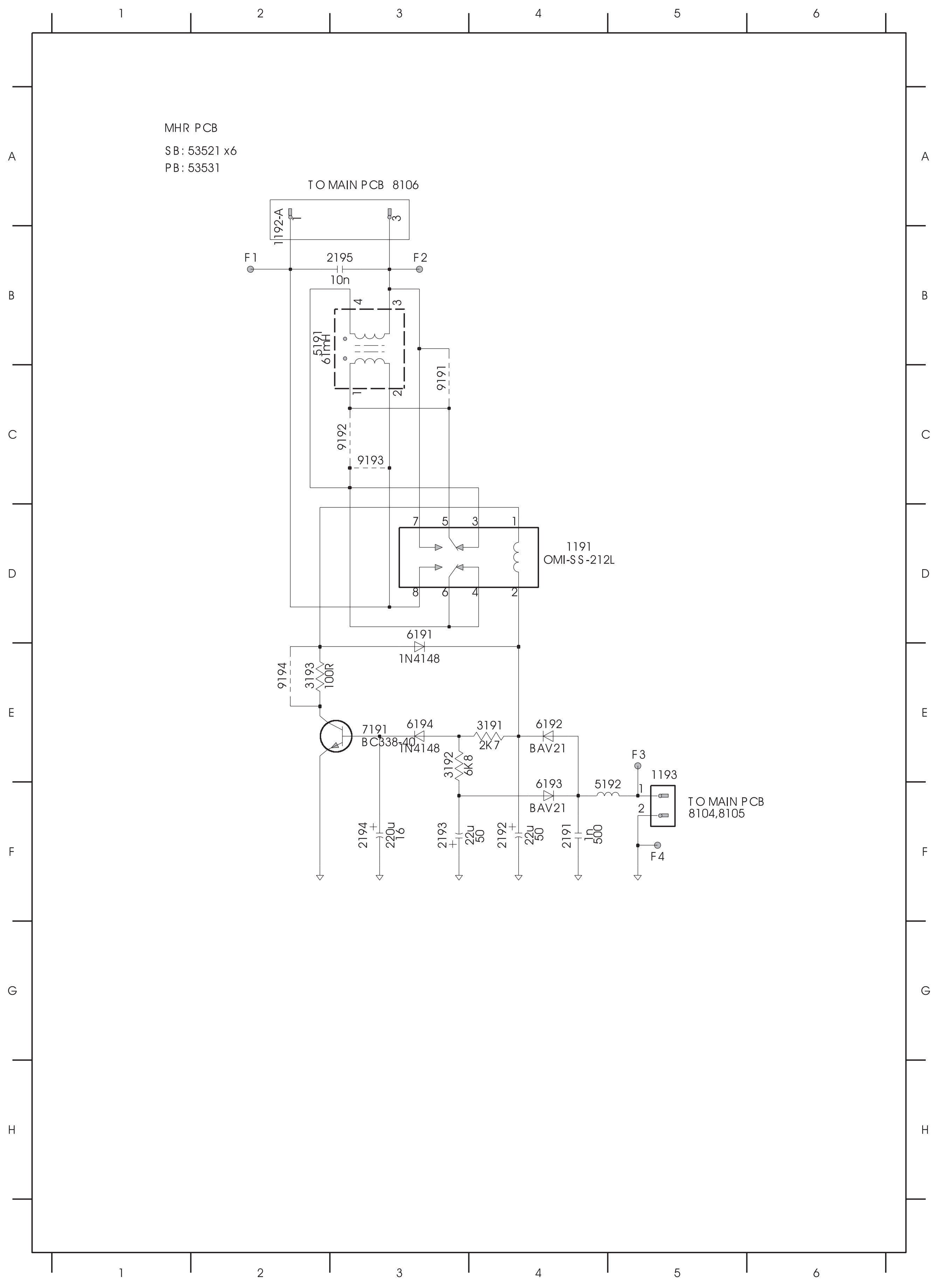

E
POWER DOWN BOARD
SB: 53351 (32x)
PB: 53361
F191
F192
F193
6191
RGP10J
3193
2M2
6192
BAV21
BC558
7191
3191
100R
1
2
3
TO MIAN PWR 8102
TO MIAN PWR 8101
TO MIAN PWR 8103
1191
JFE625H
47n
2191
470K
3192
3192
3191
6191
6192
3193
A
1

1191	D
2191	E
3191	D
3192	E
3193	D
6191	D
6192	D
7191	D
F191	D
F192	D
F193	D

PCB(E)


1
2
A
B
2191
6194
3193
6191
2195

MHR Diagram


MHR PCB
SB: 53521 x6
PB: 53531
TO MAIN PCB 8106
1192-A
F1
2195
10n
F2
5191
61mH
9191
9192
9193
1191
OMI-SS-212L
6191
1N4148
9194
3193
100R
7191
BC338-40
6194
1N4148
3191
2K7
6192
BAV21
3192
6K8
6193
BAV21
5192
F3
1193
TO MAIN PCB
8104,8105
F4
2194
220u
16
2193
22u
50
2192
22u
50
2191
1n
500

1191	C
1192-A	
1193	E
2191	F
2192	F
2193	F
2194	F
2195	B
3191	E
3192	E
3193	E
5191	B
5192	F
6191	D
6192	E
6193	F
6194	E
7191	E
9191	C
9192	C
9193	C
9194	E

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0. Warning

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the unit via a wrist wrap with resistance. Keep components and tools also at the same potential !

1. Servicing of SMDs (Surface Mounted Devices)

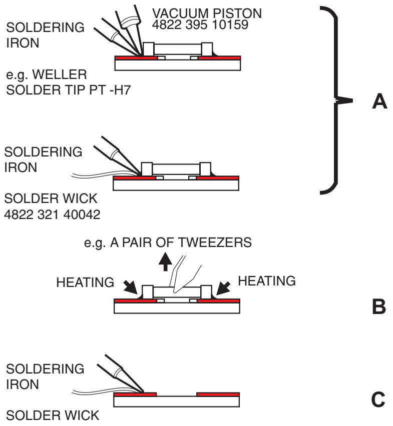
1.1 General cautions on handling and storage

- Oxidation on the terminals of SMDs results in poor soldering. Do not handle SMDs with bare hands.
- Avoid using storage places that are sensitive to oxidation such as places with sulphur or chlorine gas, direct sunlight, high temperatures or a high degree of humidity. The capacitance or resistance value of the SMDs may be affected by this.
- Rough handling of circuit boards containing SMDs may cause damage to the components as well as the circuit boards. Circuit boards containing SMDs should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections may be damaged due to the stress. Never rub or scrape chip components as this may cause the value of the component to change. Similarly, do not slide the circuit board across any surface.

1.2 Removal of SMDs

- Heat the solder (for 2-3 seconds) at each terminal of the chip. By means of litz wire and a slight horizontal force, small components can be removed with the soldering iron. They can also be removed with a solder sucker (see Fig. 1A)

Fig. 1 DISMOUNTING



- While holding the SMD with a pair of tweezers, take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1 B).
- Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1C).

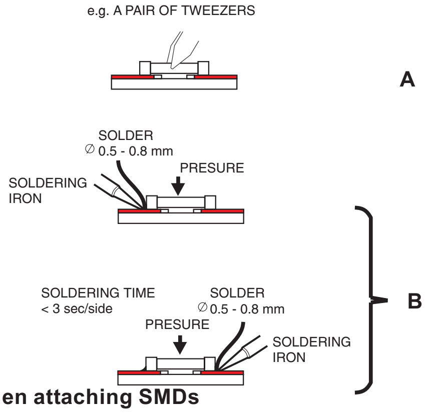
1.3 Caution on removal

- When handling the soldering.iron. use suitable pressure and be careful.
- When removing the chip, do not use undue force with the pair of tweezers.
- The soldering iron to be used (approx. 30 W) should preferably be equipped with a thermal control (soldering temperature: 225 to 250 °C).
- The chip, once removed, must never be reused.

1.4 Attachment of SMDs

- Locate the SMD on the solder lands by means of tweezers and solder the component on one side. Ensure that the component is Positioned correctly on the solder lands (see Fig.2A).
- Next complete the soldering of the terminals of the component (see Fig. 2B).

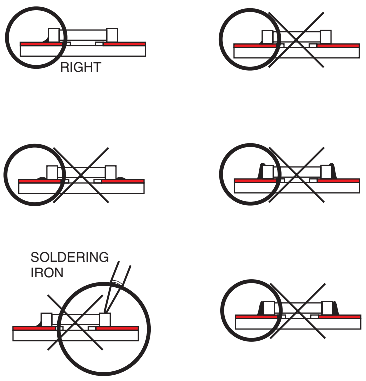
Fig. 2 MOUNTING



2. Caution when attaching SMDs

- When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering should be done as quickly as possible, care must be taken to avoid damage to the terminals of the SMDs themselves.
- Keep the SMD's body in contact with the printed board when soldering.
- The soldering iron to be used (approx. 30 W) should preferably be equipped with a thermal control (soldering temperature: 225 to 250 °C).
- Soldering should not be done outside the solder land.
- Soldering flux (of rosin) may be used, but should not be acidic.
- After soldering, let the SMD cool down gradually at room temperature.
- The quantity of solder must be proportional to the size of the solder land. If the quantity is too great, the SMD might crack or the solder lands might be torn loose from the printed board (see Fig. 3).

Fig. 3 Examples



Exploded View

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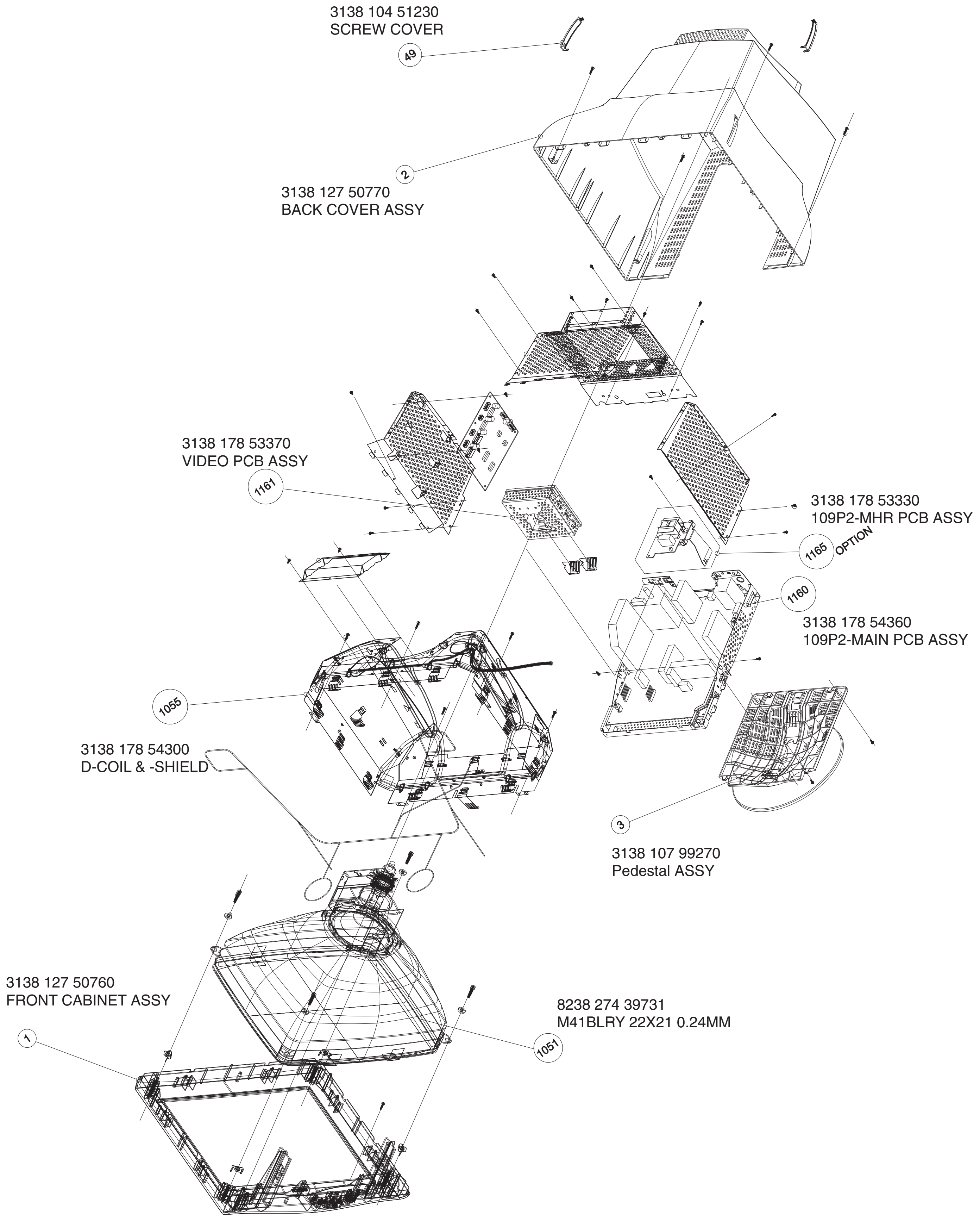
3138 104 51230
SCREW COVER
49
2
3138 127 50770
BACK COVER ASSY
3138 178 53370
VIDEO PCB ASSY
1161
3138 178 53330
109P2-MHR PCB ASSY
1165
OPTION
1160
3138 178 54360
109P2-MAIN PCB ASSY
1055
3138 178 54300
D-COIL & -SHIELD
3
3138 107 99270
Pedestal ASSY
3138 127 50760
FRONT CABINET ASSY
1
8238 274 39731
M41BLRY 22X21 0.24MM
1051

Recommended Parts List

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Model :109P20/00C

Parts indicated on exploded view

1	3138 127 50760	FRONT CABINET ASSY
2	3138 107 50770	BACK COVER ASSY
3	3138 107 99270	PEDESTAL ASSY
43	3138 104 49440	BACK COVER
44	3138 104 49470	BASE-PEDESTA
46	3138 104 51180	KNOB OSD
47	3138 104 54050	KNOB POWER
53	3138 104 49460	SWIVEL
1051	8238 274 39731	CRT 19"M46LRY22X21 0.24MM
1055	3138 178 54301	D-COIL & F-SHIELD ASSY
1160	3138 178 54361	109P2 MAIN PCB ASSY
1161	3138 178 53371	109P2 VIDEO PCB ASSY
1162	3138 178 04701	TERMINAL PCB ASSY
1163	3138 178 53381	109P2 CONTROL PCB ASSY
1164	3138 178 06951	DRIVE PCB ASSY
1165	3138 178 53330	109P2-MHR PCB ASSY
1166	3138 178 50321	POWER DOWN PCB ASSY
601	3138 117 02651	E-D.F.U ASSY (CD+ROM+Quick Start Guide)
602	3138 117 02661	E-D.F.U(CD-ROM Disc)
178	3138 106 58051	SETTING UP GUIDE

450	3138 106 59311	CARTON
451	3138 106 56792	CUSHION-BOTTOM
452	3138 106 56801	CUSHION-TOP
454	3138 106 56651	PE BAG
1053	2438 070 98118	MAINS CORD
1054	3138 168 74451	I/F CABLE
1103	2422 086 00208	FUSE T4AH/ 250V

1265	3138 178 53391	EEPROM ASSYGS109P2(7336)
5130	3138 168 74281	POWER TRANSFORMER
5503	3138 168 73551	LINEARITY COIL(54A-9050H)
5504	3138 168 73541	LINEARITY COIL(54A-9049H)
5601	3138 128 74411	DAF TRANSFORMER
5671	3138 168 76541	L.O.T

7111	3198 020 43011	TRANS BF422
7121	9322 145 76682	ICSTRF6656(LF1352)
7130	9322 140 14667	PHOTOCOUPLER TCET1103G
7143	9322 092 00687	IC L4940V5 3P
7144	9337 739 70687	MOSFET IR640
7146	9340 039 60126	TRANS BSN254A
7155	9337 711 00686	IC TL431CLPRP 3P
7301	3138 178 54161	109P2-OTP CPU ASSY
7364	9339 208 10682	IC L7808CV 3P
7404	9332 826 60652	IC HEF4053BP 16P
7421	9352 623 32112	IC TDA4856/V2 32P
7491	9322 098 98682	IC ST24LCBB6 8P
7502	9322 144 42671	TRANS 2SC5445
7622	9322 145 62667	TRANS LA5058

Spare Parts List

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Model :109P20/00C

Item	code number	Description
0001	313812750760	FRONT CABINET ASSY (109P2)
0002	313812750770	BACK COVER ASSY (109P2)
0003	313810799270	PEDESTAL ASSY
0004	313812750780	KNOB ASSY (109P2)
0043	313810449440	REAR-COVER
0044	313810449470	BASE
0046	313810451180	KNOB-OSD
0047	313810454050	KNOB-POWER
0048	313810450672	LENS-POWER
0049	313810451230	SCREW COVER
0053	313810449460	SWIVEL
0151	313810632613	P.E. BAG
0153	313810658051	P.E. BAG-E-D.F.U.
0178	313810658051	SETTING UP GUIDE
1051	823827439731	CRT 19" M46LRY 22X21 0.24MM
1053	243807098118	MAINS CORD
1054	313816874451	I/F CABLE
1059	332214489801	SPOILER
1061	313816875661	DEGASSING COIL
1102	243812800107	POWER SWITCH
1103▲	242208600208	FUSE T4AH 250V
1130	243813200056	RELAY - OMI-SS-212DM
1160	313817854361	109P2-M MAIN PCB ASSY 5430
1161	313817853371	109P2-VIDEO PCB ASSY
1162	313817804701	TERMINAL PCB ASSY
1163	313817853381	109P2-CONTROL PCB ASSY 5230
1164	313817806951	DRIVE PCB ASSY 5252
1165	313817853330	109P2 MHR PCB ASSY(OPTION)
1166	313817850321	POWER DOWN PCB ASSY
1265	313817853391	109P2-M EEPROM ASSY(7336-M24C1
1272	313817806391	VIDEO IC ASSY LM2402(7705)
1301	243854300064	CRYSTAL-12MHZ
0450	313810659311	CARTON
0451	313810656792	CUSHION - BOTTOM
0452	313810656801	CUSHION - TOP
0454	313810656651	PE BAG
0601	313811702651	E-D.F.U ASSY-W/O V/E
0602	313811702661	E-D.F.U-W/O V/E

2001	203803550227	ELECAP SS 220U 10V 6*7T	
2002	203803550312	ELCAP SS 220UF 16V	
2003	203803500037	ELCAP SM 16V 47U PM20 2E	T
2004	203803500037	ELCAP SM 16V 47U PM20 2E	T
2005	203803500037	ELCAP SM 16V 47U PM20 2E	T
2007	203803500037	ELCAP SM 16V 47U PM20 2E	T
2008	223891015649	CER2 0805 X7R 25V 100N CO	
2010	223891015649	CER2 0805 X7R 25V 100N CO	
2011	203803500037	ELCAP SM 16V 47U PM20 2E	T
2013	203803500037	ELCAP SM 16V 47U PM20 2E	T
2017	223891015649	CER2 0805 X7R 25V 100N CO	
2018	223886115109	CAP 10PF 0805 SMD	
2019	223886115109	CAP 10PF 0805 SMD	
2020	223886115109	CAP 10PF 0805 SMD	

Item	Code Number	Description	
2021	223886115109	CAP 10PF 0805 SMD	
2023	203803550227	ELECAP SS 220U 10V 6*7T	
2025	203803550227	ELECAP SS 220U 10V 6*7T	
2027	203803550227	ELECAP SS 220U 10V 6*7T	
2031	223886115229	CAP 22PF 0805 SMD NPO	
2032	223886115229	CAP 22PF 0805 SMD NPO	
2033	223886115229	CAP 22PF 0805 SMD NPO	
2034	223886115229	CAP 22PF 0805 SMD NPO	
2035	223891015649	CER2 0805 X7R 25V 100N CO	
2036	223891015649	CER2 0805 X7R 25V 100N CO	
2102	202030790011	ACROSS LINE CAP 250V 220N PM10	
2103	203803500042	ELCAP LXK 400V S 330U PM 20	
2104	823827437251	CAP MEF 400V 33N	
2111	203803155101	ELCAP S 35V 100UF PM20 2E	
2112	203803550202	ELCAP SH 250V S 1U PM20	A
2115	202055890542	CER2 DC RR 1KV S 100P PM10	A
2116	203803145479	ELCAP VT 25V 47UF PM20 2E	T
2121	202055890555	CCAP DC RR 1KV S 470P K	A
2122	202055890557	CERC RR 1KVDC 1N PM10	
2123	223858015636	CER2 0805 X7R 50V 10N PM10	R
2124	202055790151	CERC DC 500V 1N0 PM10	
2125	223858015641	SMD C0805 22N 63V PM10 X710	R
2127	222234741473	POLCAP S 250V 47N PM10 6E	
2128	202055490139	CERSAF NSB 250V S 4N7 PM20	B
2129	202055490127	CERSAF NSA 250V S 2N2 PM20	B
2130▲	202055490149	CAP Y ECKWNA 250V 3N3	
2131	203803500081	ELCAP SX 250V S 100U PM20	B
2133	203803500099	ELCAP SX 100V S 220U PM20	B
2134	203803500079	ELCAP SX 25V S 2200U PM20	B
2135	203803500078	ELCAP SX 25V S 1000U PM20	B
2137	203803500078	ELCAP SX 25V S 1000U PM20	B
2139	203803500056	ELCAP 2200UF 16V SX PM20	
2142	203801700325	ELCAP VZ 10V S 4700U PM20	B
2143	203801700325	ELCAP VZ 10V S 4700U PM20	B
2144	203803195005	ELCAP S 160V 1UF PM20 2E	T
2145	202055890542	CER2 DC RR 1KV S 100P PM10	A
2151	203803165478	ELCAP 4UF7 50V PM20 VT	A
2154	223891015645	CAP 47NF SMD 0805 X7R	
2155	223886115471	CMC 0805 NPO 470P 50V J	
2156	202055490149	CAP Y ECKWNA 250V 3N3	
2160	203803452101	ELCAP S 10V 100UF PM20 2E	T
2161	223891015649	CER2 0805 X7R 25V 100N CO	
2162	223891015649	CER2 0805 X7R 25V 100N CO	
2192	203830200203	MEF CAP 630V 47N 6E PM10	
2201	225232512103	CERC CAP 50V 10N X7R 2E	
2202	203803454101	ELCAP S 25V 100UF PM20 2E	
2209	203803454101	ELCAP S 25V 100UF PM20 2E	
2213	225232512103	CERC CAP 50V 10N X7R 2E	
2229	225232512103	CERC CAP 50V 10N X7R 2E	
2230	203803453229	ELCAP S 16V 22UF PM20 2E	
2231	203803453229	ELCAP S 16V 22UF PM20 2E	
2234	203803453229	ELCAP S 16V 22UF PM20 2E	
2239	203803142471	ELCAP 470UF 25V PM20 2E 105C	B
2240	203803453229	ELCAP S 16V 22UF PM20 2E	
2248	203803453229	ELCAP S 16V 22UF PM20 2E	
2249	203803424471	ELCAP S 25V 470UF PM20 2E	
2250	203803424471	ELCAP S 25V 470UF PM20 2E	
2251	203803424471	ELCAP S 25V 470UF PM20 2E	
2252	203803423471	ELCAP S 16V 470UF PM20 2E	B
2302	223858016614	CER2 0805 X7R 50V 1N PM10	
2304	203830250095	MEF CAP 100V 100N PM10 2E	
2306	203803456109	ELCAP S 50V 10UF PM20 2E	
2309	223886115339	CAP 33PF 0805 SMD NPO	
2310	223886115339	CAP 33PF 0805 SMD NPO	
2311	203803550227	ELECAP SS 220U 10V 6*7T	
2312	203830250212	POLCAP 100V 100N PM5 2E	T
2313	223886115229	CAP 22PF 0805 SMD NPO	
2314	223886115229	CAP 22PF 0805 SMD NPO	
2315	223858016614	CER2 0805 X7R 50V 1N PM10	
2316	203803550227	ELECAP SS 220U 10V 6*7T	
2317	203803456109	ELCAP S 50V 10UF PM20 2E	
2336	203830250095	MEF CAP 100V 100N PM10 2E	
2337	223886115229	CAP 22PF 0805 SMD NPO	

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2338	223886115229	CAP 22PF 0805 SMD NPO
2361	203803135331	ELCAP S 16V 330UF PM20 2E T
2362	203803135101	ELCAP VT 16V 100UF PM20 2E T
2391	223891015649	CER2 0805 X7R 25V 100N CO
2392	223886115101	CER2 0805 NPO 50V 100P
2401	203830250095	MEF CAP 100V 100N PM10 2E
2421	203830250095	MEF CAP 100V 100N PM10 2E
2422	203830250121	MEF CAP 100V 150N 2E PM10
2423	202055290607	CERC DC NPO 50V 220P PM5 2E T
2424	223891015649	CER2 0805 X7R 25V 100N CO
2425	203803453102	ELCAP S 16V 1000UF PM20 T
2426	202055290594	CERC DC NPO 50V 22P PM5 2E T
2431	203830250212	POLCAP 100V 100N PM5 2E T
2432	203830150186	PPN 100V 8N2 PM5 T
2433	203830250218	MEF CAP 10N 100V PM2 2E
2434	203830150157	CAP PP PPN 100V S 5N6 PM2 A
2435	203830150186	PPN 100V 8N2 PM5 T
2441	203830150191	PPN 100V 3N3 PM2 T
2442	223886115471	CMC 0805 NPO 470P 50V J
2443	223891015645	CAP 47NF SMD 0805 X7R
2444	223891015645	CAP 47NF SMD 0805 X7R
2445	203803453479	ECAP S 16V 47UF M 2E T
2446	203830250099	POLCAP 100V 470N PM10 2E
2456	203803453479	ECAP S 16V 47UF M 2E T
2461	202030190148	PPN CAP 220N 250V PM5 9E
2462	223886115221	MLCC 0850 NPO 220PF J 4B 9
2463	203803453479	ECAP S 16V 47UF M 2E T
2464	223858016624	SMD0805X7R 5N6 50V +/-10%
2491	203830250095	MEF CAP 100V 100N PM10 2E
2492	223886115101	CER2 0805 NPO 50V 100P
2493	223886115101	CER2 0805 NPO 50V 100P
2501	203803195005	ELCAP S 160V 1UF PM20 2E T
2502	203802650007	NON-POLAR CAP 160V 1U C
2503	203830250095	MEF CAP 100V 100N PM10 2E
2506	202055890561	CERC CAP RR 2KV 220P PM10 B
2507	202055890561	CERC CAP RR 2KV 220P PM10 B
2508	203830100404	PPNS CAP 2KV 4N7 PM5 B
2515	202055890557	CERC RR 1KVDC 1N PM10
2516	203830250099	POLCAP 100V 470N PM10 2E
2518	203830250095	MEF CAP 100V 100N PM10 2E
2519	203830250095	MEF CAP 100V 100N PM10 2E
2520	203830250095	MEF CAP 100V 100N PM10 2E
2542	203830200155	MEF CAP 250V 100N PM10
2543	203803500048	ELCAP SEK 250V S 100U PM20 B
2544	202055890561	CERC CAP RR 2KV 220P PM10 B
2545	223891015649	CER2 0805 X7R 25V 100N CO
2546	223891015649	CER2 0805 X7R 25V 100N CO
2551	203803145479	ELCAP VT 25V 47UF PM20 2E T
2552	203803145479	ELCAP VT 25V 47UF PM20 2E T
2553	203830100164	CAP PP PPN 250V S 150N PM5 B
2554	203830100412	PPN CAP 68N 250V PM5 8E
2566	203803165109	ELCAP VT 50V 10UF PM20 2E
2567	203803142471	ELCAP 470UF 25V PM20 2E 105C B
2568	203803455101	ELCAP S 35V 100UF PM20 2E
2569	202055290607	CERC DC NPO 50V 220P PM5 2E T
2576	203830250093	MEF CAP 100V 22N PM10 2E
2577	203803142471	ELCAP 470UF 25V PM20 2E 105C B
2578	203830250095	MEF CAP 100V 100N PM10 2E
2579	203830250099	POLCAP 100V 470N PM10 2E
2586	203830250212	POLCAP 100V 100N PM5 2E T
2587	203830250095	MEF CAP 100V 100N PM10 2E
2588	203830250095	MEF CAP 100V 100N PM10 2E
2589	203830250095	MEF CAP 100V 100N PM10 2E
2601	202055890604	CERC CAP 100P 2KV RR TYPE
2602	202055890604	CERC CAP 100P 2KV RR TYPE
2603	202055890557	CERC RR 1KVDC 1N PM10
2604	202055890604	CERC CAP 100P 2KV RR TYPE
2605	202055890561	CERC CAP RR 2KV 220P PM10 B
2608	223555900099	CERC CAP 2KV 10N PM20 4E
2611	203803454479	ELCAP S 25V 47UF PM20 2E T
2612	223891015649	CER2 0805 X7R 25V 100N CO
2613	203803456479	ELCAP S 50V 47UF PM20 2E T
2621	203830100208	CAP PP PPN 250V S 47N PM5 B
2622	203830100184	CAP PP PPN 250V S 68N PM5 B
2623	203830100305	MPS CAP 180N 250V PM5
2624	203830100331	MPS CAP 360N 250V PM5 7E
2625	203830100222	MPS CAP 820N 250V PM5 8E

Item	Code Number	Description
2626	203830100217	CAP MPS 1U5 250V PM5 B
2651	203803456108	ELCAP S 50V 1UF PM20 2E T
2652	223858016616	CER2 0805 X7R 63V 1N5 PM10 R
2653	223858016621	MLCC 0805 X7R 3N3 K 4B 9
2655	203830150151	CAP PP PPN 100V S 10N PM2 B
2656	203803145221	ELCAP S 25V 220UF PM20 2E T
2657	223858016615	CER2 0805 X7R 63V 1N2 PM10 R
2658	223878019858	CER2 0805 Y5V 16V 470N P8020 R
2659	203803454479	ELCAP S 25V 47UF PM20 2E T
2660	223878019858	CER2 0805 Y5V 16V 470N P8020 R
2661	223878019858	CER2 0805 Y5V 16V 470N P8020 R
2671	203803192003	ELCAP S 250V 33UF PM20 2E
2672	223891015649	CER2 0805 X7R 25V 100N CO
2673	202055890562	CERC RB 2KVDC 330PF
2681	223858016618	CAP 2NF2 0805 SMD X7R T
2682	203803500081	ELCAP SX 250V S 100U PM20 B
2683	203830100174	CAP PP PPN 630V S 4N7 PM5 A
2684	222234741473	POLCAP S 250V 47N PM10 6E
2685	203803453479	ECAP S 16V 47UF M 2E T
2686	202055890557	CERC RR 1KVDC 1N PM10
2691	222234741473	POLCAP S 250V 47N PM10 6E
2693	203830200226	CAP MPOL 100V S 1U8 PM5 B
2694	203830250212	POLCAP 100V 100N PM5 2E T
2701	223886115478	SMD 0805 NPO 4P7 50V 0.25P
2702	223858016627	CER2 0805 X7R 50V 10N PM10 R
2704	203803522801	ECAP NP 1U 160V 105C NK
2705	203803550202	ELCAP SH 250V S 1U PM20 A
2706	242254944346	SPARK GAP DSP-201m
2707	223891015649	CER2 0805 X7R 25V 100N CO
2708	223891015649	CER2 0805 X7R 25V 100N CO
2709	223891015649	CER2 0805 X7R 25V 100N CO
2710	223886115279	CAP 27PF 0805 SMD NPO
2720	222286112479	MLCC 0805 NPO 50V 47P COL R
2721	223886115478	SMD 0805 NPO 4P7 50V 0.25P
2722	223858016627	CER2 0805 X7R 50V 10N PM10 R
2724	203803522801	ECAP NP 1U 160V 105C NK
2725	203803550202	ELCAP SH 250V S 1U PM20 A
2726	242254944346	SPARK GAP DSP-201m
2727	223891015649	CER2 0805 X7R 25V 100N CO
2732	232273091002	RST SM 0805 JUMP. MAX 0R05 T
2736	222291019856	CER2 0805 Y5V 25V 330N P8020 R
2740	223886115229	CAP 22PF 0805 SMD NPO
2741	223886115478	SMD 0805 NPO 4P7 50V 0.25P
2742	223858016627	CER2 0805 X7R 50V 10N PM10 R
2744	203803522801	ECAP NP 1U 160V 105C NK
2745	203803550202	ELCAP SH 250V S 1U PM20 A
2746	242254944346	SPARK GAP DSP-201m
2748	203803145479	ELCAP VT 25V 47UF PM20 2E T
2749	223891015649	CER2 0805 X7R 25V 100N CO
2750	223891015649	CER2 0805 X7R 25V 100N CO
2751	223891015649	CER2 0805 X7R 25V 100N CO
2752	203803182479	ELCAP VT 100V S 47U PM20 B
2753	203803550202	ELCAP SH 250V S 1U PM20 A
2760	223891015649	CER2 0805 X7R 25V 100N CO
2761	223555900099	CERC CAP 2KV 10N PM20 4E
2762	225260214416	CERC CAP DC 2KV 470P PM10 X7R
2763	202055790151	CERC DC 500V 1N0 PM10
2764	225261108216	DISC CAP Y5P 1KV 220PF K 2E T
2765	225260214216	CERCAP DC 2KV 220P K X7R T
2770	203803165109	ELCAP VT 50V 10UF PM20 2E
2771	223891015649	CER2 0805 X7R 25V 100N CO
2772	203803145479	ELCAP VT 25V 47UF PM20 2E T
2773	223891015649	CER2 0805 X7R 25V 100N CO
2774	223891015649	CER2 0805 X7R 25V 100N CO
2775	203803135331	ELCAP S 16V 330UF PM20 2E T
2776	223891015649	CER2 0805 X7R 25V 100N CO
2777	203803145479	ELCAP VT 25V 47UF PM20 2E T
2778	223891015649	CER2 0805 X7R 25V 100N CO
2779	203803182479	ELCAP VT 100V S 47U PM20 B
2780	203830250095	MEF CAP 100V 100N PM10 2E
2781	203803550202	ELCAP SH 250V S 1U PM20 A
2782	203830250166	MEF CAP 400V 10N PM10 2E T
2783	223886115229	CAP 22PF 0805 SMD NPO
2784	223886115229	CAP 22PF 0805 SMD NPO
2785	223886115229	CAP 22PF 0805 SMD NPO

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Item	Code Number	Description
2786	223886115229	CAP 22PF 0805 SMD NPO
2787	223891015649	CER2 0805 X7R 25V 100N CO
2788	223891015649	CER2 0805 X7R 25V 100N CO
2789	223886115101	CER2 0805 NPO 50V 100P
2790	223886115101	CER2 0805 NPO 50V 100P
2791	203803135101	ELCAP VT 16V 100UF PM20 2E T
2792	223858016623	MLCC 0805 X7R 4N7F K 4B 9
2793	223886115101	CER2 0805 NPO 50V 100P
2794	223886115221	MLCC 0850 NPO 220PF J 4B 9
2795	223858015641	SMD C0805 22N 63V PM10 X710 R
2796	223886115221	MLCC 0850 NPO 220PF J 4B 9
2798	203803135101	ELCAP VT 16V 100UF PM20 2E T
2799	223891015649	CER2 0805 X7R 25V 100N CO
2801	223858016627	CER2 0805 X7R 50V 10N PM10 R
2802	223886115101	CER2 0805 NPO 50V 100P
2803	223891015649	CER2 0805 X7R 25V 100N CO
2804	223886115181	MLCC 0805 NPO 180PF J 4B 9
2805	223891015649	CER2 0805 X7R 25V 100N CO
2806	223891015649	CER2 0805 X7R 25V 100N CO
2807	223891015649	CER2 0805 X7R 25V 100N CO
2811	203803550202	ELCAP SH 250V S 1U PM20 A
2812	223858016614	CER2 0805 X7R 50V 1N PM10
2813	223858016621	MLCC 0805 X7R 3N3 K 4B 9
2814	223891015649	CER2 0805 X7R 25V 100N CO
2815	223891015649	CER2 0805 X7R 25V 100N CO
2821	223858016614	CER2 0805 X7R 50V 1N PM10
2822	223858016621	MLCC 0805 X7R 3N3 K 4B 9
2831	223858016614	CER2 0805 X7R 50V 1N PM10
2832	223858016621	MLCC 0805 X7R 3N3 K 4B 9
2891	223891015649	CER2 0805 X7R 25V 100N CO
2892	223891015649	CER2 0805 X7R 25V 100N CO
2893	223891015649	CER2 0805 X7R 25V 100N CO
2894	223858016627	CER2 0805 X7R 50V 10N PM10 R
2895	223858016627	CER2 0805 X7R 50V 10N PM10 R
3001	232273061222	RST SM 0805 RC11 2K2 PM5 R
3004	232273061222	RST SM 0805 RC11 2K2 PM5 R
3006	232273061479	RES 47R 0805 SMD RC-11 T
3007	232273467509	RST SM 0805 RC11 75R PM1 T
3008	232273061479	RES 47R 0805 SMD RC-11 T
3009	232273467509	RST SM 0805 RC11 75R PM1 T
3010	232273061479	RES 47R 0805 SMD RC-11 T
3011	232273467509	RST SM 0805 RC11 75R PM1 T
3012	232273061471	RST SM 0805 RC11 470R PM5 R
3013	232273061471	RST SM 0805 RC11 470R PM5 R
3014	232273061471	RST SM 0805 RC11 470R PM5 R
3015	232273061471	RST SM 0805 RC11 470R PM5 R
3016	232273061479	RES 47R 0805 SMD RC-11 T
3017	232273467509	RST SM 0805 RC11 75R PM1 T
3018	232273061222	RST SM 0805 RC11 2K2 PM5 R
3019	232273061479	RES 47R 0805 SMD RC-11 T
3020	232273467509	RST SM 0805 RC11 75R PM1 T
3021	232273061479	RES 47R 0805 SMD RC-11 T
3022	232273467509	RST SM 0805 RC11 75R PM1 T
3023	232273061222	RST SM 0805 RC11 2K2 PM5 R
3103	213866000033	NTC THERMISTOR 8R PM15 SCK-081
3104	213810500337	1W 100K RSS (T)
3105	213810500337	1W 100K RSS (T)
3106	212010592436	MET FLM RSS 3W 47K PM5
3107	213811612204	RST MFLM MF50S A 220K PM1 A
3108	213811612704	RST MFLM MF50S A 270K PM1 A
3109	213811612203	RST MFLM MF50S A 22K PM1 A
3111	213810500332	RST 5W 22K PM5
3112	213811614703	RST MFLM MF50S A 47K PM1 A
3115	213811613302	RST MFLM MF50S A 3K3 PM1 A
3121	213811611002	RST MFLM MF50S A 1K PM1 A
3123	213810500338	5W 0.12R MPR 6E
3124	232273061103	RES 10K RC-11 SMD 0805 T
3125	213811615602	RST MFLM MF50S A 5K6 PM1 A
3128	232266296758	DEGAUSSING PTC THERMISTOR B
3140	232273061102	RST SMC 0805 RC11 1K PM5 T
3141	213811273331	CARBRST FLM CR25 330R PM5 T
3142	212010592383	MTL RES 2W 2R2 RSS .M
3143	232273091002	RST SM 0805 JUMP. MAX 0R05 T
3144	232273061105	RES 1M RC-11 SMD 0805 T
3145	212010592169	RES 2W 12K
3146	213810113103	RST CRB CR12 A 10K PM5 A
3147	212266200119	POLYSWITCH RXE065-AP
3148	232273061682	RES 6K8 0805 SMD
3151	232273061102	RST SMC 0805 RC11 1K PM5 T
3152	213811273102	CARBRST FLM CR25 1K0 PM5 5
3153	232273061101	RST SM 0805 RC11 100R PM5 R
3154	213811613304	RST MFLM MF50S A 330K PM1 A
3155	232273061105	RES 1M RC-11 SMD 0805 T
3156	232273061472	RST SM 0805 RC11 4K7 PM5 R
3157	213836500081	RTRM CER LIN 1K H VG067TL1 B
3160	213811614709	RST MFLM MF50S A 47R PM1 A
3161	213810113223	RST CRB CR12 A 22K PM5 A
3162	213810113103	RST CRB CR12 A 10K PM5 A
3163	213811612709	RST MFLM MF50S A 27R PM1 A
3167	213811611004	RST MFLM MF50S A 100K PM1 A
3191	213810113101	RST CRB CR12 A 100R PM5 A
3192	213810113474	RST CRB CR12 A 470K PM5 A
3193	232224213225	METGLAZ RST A VR37 2M2 PM5 T
3201	212010592397	MET FLM RST RSS 3W 120R PM5 8E
3204	213811612402	RST MFLM MF50S A 2K4 PM1 A
3205	213811619109	RST MFLM MF50S A 91R PM1 A
3206	213811612402	RST MFLM MF50S A 2K4 PM1 A
3207	213811611201	RST MFLM MF50S A 120R PM1 A
3210	213811611002	RST MFLM MF50S A 1K PM1 A
3217	213811612103	RST MFLM MF50S A 21K PM1 A
3218	213811611204	RST MFLM MF50S A 120K PM1 A
3219	213811612103	RST MFLM MF50S A 21K PM1 A
3221	213811611204	RST MFLM MF50S A 120K PM1 A
3222	213811611503	RST MFLM MF50S A 15K PM1 A
3223	213811611304	RST MFLM MF50S A 130K PM1 A
3224	213811611503	RST MFLM MF50S A 15K PM1 A
3225	213811611304	RST MFLM MF50S A 130K PM1 A
3230	213811273103	CARBRST FLM CR25 10K PM5
3231	213811273103	CARBRST FLM CR25 10K PM5
3236	213811613002	RST MFLM MF5OS A 3K PM1 A
3237	213811614703	RST MFLM MF50S A 47K PM1 A
3238	213811614703	RST MFLM MF50S A 47K PM1 A
3239	213811614703	RST MFLM MF50S A 47K PM1 A
3241	213811273102	CARBRST FLM CR25 1K0 PM5 5
3242	213811273102	CARBRST FLM CR25 1K0 PM5 5
3243	213811273102	CARBRST FLM CR25 1K0 PM5 5
3244	213811273102	CARBRST FLM CR25 1K0 PM5 5
3246	213811273102	CARBRST FLM CR25 1K0 PM5 5
3247	213811273102	CARBRST FLM CR25 1K0 PM5 5
3248	213811273152	CARBRST FLM CR25 1K5 PM5
3249	213811611304	RST MFLM MF50S A 130K PM1 A
3250	213811611803	RST MFLM MF50S A 18K PM1 A
3251	213811611304	RST MFLM MF50S A 130K PM1 A
3252	213811611803	RST MFLM MF50S A 18K PM1 A
3253	213811611304	RST MFLM MF50S A 130K PM1 A
3254	213811611803	RST MFLM MF50S A 18K PM1 A
3255	213811611304	RST MFLM MF50S A 130K PM1 A
3256	213811611803	RST MFLM MF50S A 18K PM1 A
3257	213811611304	RST MFLM MF50S A 130K PM1 A
3258	213811611803	RST MFLM MF50S A 18K PM1 A
3259	213811611304	RST MFLM MF50S A 130K PM1 A
3260	213811611803	RST MFLM MF50S A 18K PM1 A
3261	213811611304	RST MFLM MF50S A 130K PM1 A
3262	213811611803	RST MFLM MF50S A 18K PM1 A
3263	213811611304	RST MFLM MF50S A 130K PM1 A
3264	213811611803	RST MFLM MF50S A 18K PM1 A
3269	213811611304	RST MFLM MF50S A 130K PM1 A
3270	213811615602	RST MFLM MF50S A 5K6 PM1 A
3271	213811611304	RST MFLM MF50S A 130K PM1 A
3272	213811615602	RST MFLM MF50S A 5K6 PM1 A
3273	213811611304	RST MFLM MF50S A 130K PM1 A
3274	213811615602	RST MFLM MF50S A 5K6 PM1 A
3275	213811611304	RST MFLM MF50S A 130K PM1 A
3276	213811615602	RST MFLM MF50S A 5K6 PM1 A
3277	213811612209	RST MFLM MF50S A 22R PM1 A
3278	213811612209	RST MFLM MF50S A 22R PM1 A
3280	213811612209	RST MFLM MF50S A 22R PM1 A

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Item	Code Number	Description
3283	213811612209	RST MFLM MF50S A 22R PM1 A
3284	213811612209	RST MFLM MF50S A 22R PM1 A
3286	213811612209	RST MFLM MF50S A 22R PM1 A
3287	213811612209	RST MFLM MF50S A 22R PM1 A
3292	213811616809	RST MFLM MF50S A 68R PM1 A
3293	213811616809	RST MFLM MF50S A 68R PM1 A
3295	213811616809	RST MFLM MF50S A 68R PM1 A
3296	213811616809	RST MFLM MF50S A 68R PM1 A
3301	213811203008	NETWORK RESISTOR
3302	213810113101	RST CRB CR12 A 100R PM5 A
3303	232273061103	RES 10K RC-11 SMD 0805 T
3304	213810113101	RST CRB CR12 A 100R PM5 A
3305	213810113104	RST CRB CR12 A 100K PM5 A
3307	232273061103	RES 10K RC-11 SMD 0805 T
3308	232273061103	RES 10K RC-11 SMD 0805 T
3309	213810113103	RST CRB CR12 A 10K PM5 A
3310	232273061472	RST SM 0805 RC11 4K7 PM5 R
3311	213810113104	RST CRB CR12 A 100K PM5 A
3312	213810113101	RST CRB CR12 A 100R PM5 A
3313	213810113101	RST CRB CR12 A 100R PM5 A
3314	213810113101	RST CRB CR12 A 100R PM5 A
3315	213810113101	RST CRB CR12 A 100R PM5 A
3316	232273061472	RST SM 0805 RC11 4K7 PM5 R
3317	213810113333	RST CRB CR12 A 33K PM5 A
3318	232273061103	RES 10K RC-11 SMD 0805 T
3319	213811611003	RST MFLM MF50S A 10K PM1 A
3320	213810113103	RST CRB CR12 A 10K PM5 A
3321	213810113101	RST CRB CR12 A 100R PM5 A
3322	213811618202	RST MFLM MF50S A 8K2 PM1 A
3323	232273061104	RES 100K RC-11 SMD 0805 T
3325	232273061472	RST SM 0805 RC11 4K7 PM5 R
3326	213810113472	RST CRB CR12 A 4K7 PM5 A
3327	213810113153	RST CRB CR12 A 15K PM5 A
3328	213811612701	RST MFLM MF50S A 270R PM1 A
3329	213811611509	RST MFLM MF50S A 15R PM1 A
3330	213810113153	RST CRB CR12 A 15K PM5 A
3331	213810113472	RST CRB CR12 A 4K7 PM5 A
3332	232273061103	RES 10K RC-11 SMD 0805 T
3333	232273061103	RES 10K RC-11 SMD 0805 T
3334	213810113101	RST CRB CR12 A 100R PM5 A
3335	213810113101	RST CRB CR12 A 100R PM5 A
3337	213810113222	RST CRB CR12 A 2K2 PM5 A
3338	213810113222	RST CRB CR12 A 2K2 PM5 A
3339	232273061103	RES 10K RC-11 SMD 0805 T
3340	232273061103	RES 10K RC-11 SMD 0805 T
3341	232273061103	RES 10K RC-11 SMD 0805 T
3342	232273061103	RES 10K RC-11 SMD 0805 T
3343	213810113103	RST CRB CR12 A 10K PM5 A
3354	213810113101	RST CRB CR12 A 100R PM5 A
3355	213810113101	RST CRB CR12 A 100R PM5 A
3393	232273061472	RST SM 0805 RC11 4K7 PM5 R
3394	232273061103	RES 10K RC-11 SMD 0805 T
3395	232273061472	RST SM 0805 RC11 4K7 PM5 R
3396	232273061103	RES 10K RC-11 SMD 0805 T
3397	213810113472	RST CRB CR12 A 4K7 PM5 A
3398	213810113101	RST CRB CR12 A 100R PM5 A
3401	232273061103	RES 10K RC-11 SMD 0805 T
3402	232273061222	RST SM 0805 RC11 2K2 PM5 R
3403	232273091002	RST SM 0805 JUMP. MAX 0R05 T
3404	213810113471	RST CRB CR12 A 470R PM5 A
3405	232273091002	RST SM 0805 JUMP. MAX 0R05 T
3421	213811612203	RST MFLM MF50S A 22K PM1 A
3422	213810113471	RST CRB CR12 A 470R PM5 A
3423	232273061472	RST SM 0805 RC11 4K7 PM5 R
3424	213810113101	RST CRB CR12 A 100R PM5 A
3425	232273061103	RES 10K RC-11 SMD 0805 T
3426	213810113101	RST CRB CR12 A 100R PM5 A
3427	213810113101	RST CRB CR12 A 100R PM5 A
3428	213810113225	RST CRB CR12 A 2M2 PM5 A
3429	232273061155	SMD R0805 1M5 PM5
3430	232273061101	RST SM 0805 RC11 100R PM5 R
3431	232273061332	RES 3K3 0805 SMD
3432	213811615101	RST MFLM MF50S A 510R PM1 A
3433	213811612802	RST MFLM MF50S A 2K8 PM1 A
3434	232273061472	RST SM 0805 RC11 4K7 PM5 R
3441	213811613903	RST MFLM MF50S A 39K PM1 A
3442	213811612204	RST MFLM MF50S A 220K PM1
3443	213810113683	RST CRB CR12 A 68K PM5 A
3444	232273091002	RST SM 0805 JUMP. MAX 0R05 T
3445	232273061564	SMD R0805 560K PM5
3446	232273061123	RES 12K RC-11 SMD 0805 T
3450▲	230620403828	RST MFLM NFR25 1/4W 8R2 PM5
3451	232273061122	RST SMC 0805 RC11 1K2 PM5 T
3456▲	230620403828	RST MFLM NFR25 1/4W 8R2 PM5
3457	232273061122	RST SMC 0805 RC11 1K2 PM5 T
3458	213811273471	CARBRST FLM CR25 470R PM5
3462	213810113103	RST CRB CR12 A 10K PM5 A
3464	232273061153	RST SM 0805 RC11 15K PM5 R
3465	213810113103	RST CRB CR12 A 10K PM5 A
3466	213810113103	RST CRB CR12 A 10K PM5 A
3467	232273061472	RST SM 0805 RC11 4K7 PM5 R
3468	213810113472	RST CRB CR12 A 4K7 PM5 A
3469	213811273473	CARBRST FLM CR25 47K PM5
3470	213810113221	RST CRB CR12 A 220R PM5 A
3471	213810113473	RST CRB CR12 A 47K PM5 A
3472	213811617503	RST MFLM MF50S A 75K PM1 A
3473	213811611003	RST MFLM MF50S A 10K PM1 A
3474	213811611504	RST MFLM MF50S A 150K PM1 A
3475	213811273103	CARBRST FLM CR25 10K PM5
3476	213811611005	RST MFLM MF50S A 1M PM1 A
3491	232273061473	RST SM 0805 RC11 47K PM5 R
3492	232273061473	RST SM 0805 RC11 47K PM5 R
3493	213810113101	RST CRB CR12 A 100R PM5 A
3494	232273061101	RST SM 0805 RC11 100R PM5 R
3495	213810113101	RST CRB CR12 A 100R PM5 A
3501	213810500335	5W 680R RSM 6E
3502	213810500334	5W 2K2 RSM 6E
3503	213810113479	RST CRB CR12 A 47R PM5 A
3504	213810113103	RST CRB CR12 A 10K PM5 A
3505	213810500335	5W 680R RSM 6E
3506	213810500408	RST MOX 7W RSH S 1R8
3507	213811616809	RST MFLM MF50S A 68R PM1 A
3515	213810500074	TST MOX5W RSM5WL S 150R PM5 B
3516	213810500076	RST MOX 5W 330R RSS PM5
3517	213811614701	RST MFLM MF50S A 470R PM1 A
3518	213811614701	RST MFLM MF50S A 470R PM1 A
3519	213811616809	RST MFLM MF50S A 68R PM1 A
3520	213811273102	CARBRST FLM CR25 1K0 PM5 5
3521	213811616809	RST MFLM MF50S A 68R PM1 A
3522	213811604478	RST MFLM MF50S A 4R7 PM5 A
3523▲	230620403159	MET FLM RST NFR25 15R PM5
3524▲	230620403159	MET FLM RST NFR25 15R PM5
3525	213811273471	CARBRST FLM CR25 470R PM5
3527	232273061103	RES 10K RC-11 SMD 0805 T
3528	213810113101	RST CRB CR12 A 100R PM5 A
3529	232273061103	RES 10K RC-11 SMD 0805 T
3530	232273061182	RES 1K8 0805 SMD
3531	213811273122	CARBRST FLM CR25 1K2 PM5
3541	213810113121	RST CRB CR12 A 120R PM5 A
3542	213810113103	RST CRB CR12 A 10K PM5 A
3544	213811611009	RST MFLM MF50S A 10R PM1 A
3545	213810500095	RST MOX 7W RSH S 33R PM5
3546▲	232220733479	RST MFLM NFR25H 47R PM5
3551▲	230620403108	RST FUSE NFR25 S 1R0 PM5 A
3552▲	230620403108	RST FUSE NFR25 S 1R0 PM5 A
3553	213811612202	RST MFLM MF50S A 2K2 PM1 A
3554	213811611203	RST MFLM MF50S A 12K PM1 A
3555	232273061103	RES 10K RC-11 SMD 0805 T
3556	232273061202	RES 2K RC-11 SMD 0805 T
3566	213810113472	RST CRB CR12 A 4K7 PM5 A
3569▲	232220733108	MET FLM RST NFR25H 1R0 PM5 T
3570	213811612202	RST MFLM MF50S A 2K2 PM1 A
3571	213811273471	CARBRST FLM CR25 470R PM5
3572	213811273471	CARBRST FLM CR25 470R PM5
3576	213811612202	RST MFLM MF50S A 2K2 PM1 A
3577▲	232220733108	MET FLM RST NFR25H 1R0 PM5 T
3578	213811614709	RST MFLM MF50S A 47R PM1 A
3579	213811273188	RES CR25 1/4W 1R8
3580	213811604228	RST MFLM MF50S A 2R2 PM5 A
3581	213811614701	RST MFLM MF50S A 470R PM1 A

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Item	CodeNumber	Description
3582	213811273188	RES CR25 1/4W 1R8
3586	213810113102	RST CRB CR12 A 1K PM5 A
3587	213811617502	RST MFLM MF50S A 7K5 PM1 A
3588	213811273152	CARBRST FLM CR25 1K5 PM5
3589	213810113222	RST CRB CR12 A 2K2 PM5 A
3590▲	232220533479	MET FLM RST NFR25 47R PM5PM5 T
3591▲	232220533479	MET FLM RST NFR25 47R PM5PM5 T
3592	213811614701	RST MFLM MF50S A 470R PM1 A
3593	213811615609	RST MFLM MF50S A 56R PM1 A
3601	232224213224	METGLAZ RST A VR37 220K PM5 T
3602	212010592168	MET FLM RST 2W 10K PM5 6E B
3603	823827437071	MEF FLM RST 2W 3K9 PM5 RSS B
3604	213811613303	RST MFLM MF50S A 33K PM1 A
3605	232224213104	METGLAZ RST A VR37 100K
3606	232224213105	METGLAZ RST A VR37 1M PM5 T
3607	232224213105	METGLAZ RST A VR37 1M PM5 T
3608	213811273332	CARBRST FLM CR25 3K3 PM5
3609	212010128152	CARBRST COMP 1/2W 1K5 PM10
3610	232273091002	RST SM 0805 JUMP. MAX 0R05 T
3611	213810113393	RST CRB CR12 A 39K PM5 A
3612	232273061223	RES 22K 0805 SMD
3613	213811614701	RST MFLM MF50S A 470R PM1 A
3614	232273061104	RES 100K RC-11 SMD 0805 T
3615	213811273392	CARBRST FLM CR25 3K9 PM5
3616	232224213105	METGLAZ RST A VR37 1M PM5 T
3617	212010128222	RST CMP ERC12 A 2K2 PM10 A
3618	232273091002	RST SM 0805 JUMP. MAX 0R05 T
3622	232273061104	RES 100K RC-11 SMD 0805 T
3623	213810113103	RST CRB CR12 A 10K PM5 A
3624	232273061104	RES 100K RC-11 SMD 0805 T
3625	213810113103	RST CRB CR12 A 10K PM5 A
3626	232273061104	RES 100K RC-11 SMD 0805 T
3627	213810113103	RST CRB CR12 A 10K PM5 A
3628	232273061104	RES 100K RC-11 SMD 0805 T
3629	213810113103	RST CRB CR12 A 10K PM5 A
3630	232273061104	RES 100K RC-11 SMD 0805 T
3631	213810113103	RST CRB CR12 A 10K PM5 A
3632	232273061104	RES 100K RC-11 SMD 0805 T
3633	213810113103	RST CRB CR12 A 10K PM5 A
3634	213811273222	CARBRST FLM CR25 2K2 PM5 T
3652	232273061472	RST SM 0805 RC11 4K7 PM5 R
3653	213811273129	CARBRST FLM R25 12R PM5
3654	232273061154	RST SM 0805 RC11 150K PM5 R
3656	232273061472	RST SM 0805 RC11 4K7 PM5 R
3657	232273061472	RST SM 0805 RC11 4K7 PM5 R
3658	213810113332	RST CRB CR12 A 3K3 PM5 A
3659	213811615602	RST MFLM MF50S A 5K6 PM1 A
3660	232273061562	RES 5.6K RC-11 SMD 0805 T
3661	232273061479	RES 47R 0805 SMD RC-11 T
3662	232273061472	RST SM 0805 RC11 4K7 PM5 R
3663	232273464702	SMD RST 0805 4K7 PM1
3664	232273061332	RES 3K3 0805 SMD
3665	232273061103	RES 10K RC-11 SMD 0805 T
3666	232273061105	RES 1M RC-11 SMD 0805 T
3667	232273061472	RST SM 0805 RC11 4K7 PM5 R
3668	232273061223	RES 22K 0805 SMD
3671	213811611005	RST MFLM MF50S A 1M PM1 A
3672▲	232220533478	RST FUSE NFR25 S 4R7 PM5
3673	232273061824	RES 820K 0805 SMD
3674	213811611002	RST MFLM MF50S A 1K PM1 A
3675	213811611009	RST MFLM MF50S A 10R PM1 A
3676	213811611003	RST MFLM MF50S A 10K PM1 A
3677	212010592444	RES 2W 68R
3678	213811273101	CARBRST FLM CR25 100R PM5
3679	213811273471	CARBRST FLM CR25 470R PM5
3680	213811273103	CARBRST FLM CR25 10K PM5
3681	213811611009	RST MFLM MF50S A 10R PM1 A
3682	232224213104	METGLAZ RST A VR37 100K
3683	212010128102	CARBRST COMP 1/2W 1K0 PM10
3684	213811614702	RST MFLM MF50S A 4K7 PM1 A
3685	213811273103	CARBRST FLM CR25 10K PM5
3686	232273061272	RES 2K7 0805 SMD
3687	232273061103	RES 10K RC-11 SMD 0805 T
3688	232273061393	RES 39K RC-11 SMD 0805 T
3689	213810113153	RST CRB CR12 A 15K PM5 A

Item	Code Number	Description
3690	213810113102	RST CRB CR12 A 1K PM5 A
3691	212010128152	CARBRST COMP 1/2W 1K5 PM10
3692	232224213684	METGLAZ RST A VR37 680K PM5
3693	213811611004	RST MFLM MF50S A 100K PM1 A
3694	213811618203	RST MFLM MF50S A 82K PM1 A
3695	213836500102	RTRM CER LIN 20K H VG067TL1 B
3696	213811611005	RST MFLM MF50S A 1M PM1 A
3697	213811618203	RST MFLM MF50S A 82K PM1 A
3698	213836500102	RTRM CER LIN 20K H VG067TL1 B
3700	232273061102	RST SMC 0805 RC11 1K PM5 T
3701	232273467509	RST SM 0805 RC11 75R PM1 T
3702	232273061479	RES 47R 0805 SMD RC-11 T
3703	232273061229	RST SM 0805 RC11 22R PM5 R
3704	232273061569	RST SMD 0805 RC11 56R PM5
3705	232273061105	RES 1M RC-11 SMD 0805 T
3706	213811615603	RST MFLM MF50S A 56K PM1 A
3707	213810113224	RST CRB CR12 A 220K PM5 A
3708	232273061823	SMD R0805 82K PM5
3709	212010128479	CARBRST COMP 1/2W 47R PM10
3710	232273061102	RST SMC 0805 RC11 1K PM5 T
3711	232273061123	RES 12K RC-11 SMD 0805 T
3712	232273061102	RST SMC 0805 RC11 1K PM5 T
3713	232273061101	RST SM 0805 RC11 100R PM5 R
3714	232273061101	RST SM 0805 RC11 100R PM5 R
3715	232273061101	RST SM 0805 RC11 100R PM5 R
3717	232273061471	RST SM 0805 RC11 470R PM5 R
3718	232273061471	RST SM 0805 RC11 470R PM5 R
3721	232273467509	RST SM 0805 RC11 75R PM1 T
3722	232273061479	RES 47R 0805 SMD RC-11 T
3723	232273061229	RST SM 0805 RC11 22R PM5 R
3724	232273061479	RES 47R 0805 SMD RC-11 T
3725	232273061105	RES 1M RC-11 SMD 0805 T
3726	213811615603	RST MFLM MF50S A 56K PM1 A
3727	213810113224	RST CRB CR12 A 220K PM5 A
3728	232273061823	SMD R0805 82K PM5
3729	212010128479	CARBRST COMP 1/2W 47R PM10
3730	232273061102	RST SMC 0805 RC11 1K PM5 T
3731	232273061123	RES 12K RC-11 SMD 0805 T
3732	232273061222	RST SM 0805 RC11 2K2 PM5 R
3733	232273061181	RES 180R 0805 SMD
3734	232273061101	RST SM 0805 RC11 100R PM5 R
3735	232273061471	RST SM 0805 RC11 470R PM5 R
3736	232273061101	RST SM 0805 RC11 100R PM5 R
3737	232273061105	RES 1M RC-11 SMD 0805 T
3738	232273061105	RES 1M RC-11 SMD 0805 T
3741	232273467509	RST SM 0805 RC11 75R PM1 T
3742	232273061479	RES 47R 0805 SMD RC-11 T
3743	232273061229	RST SM 0805 RC11 22R PM5 R
3744	232273061569	RST SMD 0805 RC11 56R PM5
3745	232273061105	RES 1M RC-11 SMD 0805 T
3746	213811615603	RST MFLM MF50S A 56K PM1 A
3747	213810113224	RST CRB CR12 A 220K PM5 A
3748	232273061823	SMD R0805 82K PM5
3749	212010128479	CARBRST COMP 1/2W 47R PM10
3750	232273061102	RST SMC 0805 RC11 1K PM5 T
3751	232273061123	RES 12K RC-11 SMD 0805 T
3760	212010128153	CARBRST COMP 1/2W 15K PM10
3761	213811273471	CARBRST FLM CR25 470R PM5
3763	212010128152	CARBRST COMP 1/2W 1K5 PM10
3765	213811611804	RST MFLM MF50S A 180K PM1 A
3766	232273061101	RST SM 0805 RC11 100R PM5 R
3767	232273061101	RST SM 0805 RC11 100R PM5 R
3768	232273061102	RST SMC 0805 RC11 1K PM5 T
3769	232273061152	RST SM 0805 RC11 1K5 PM5 R
3781	232273061562	RES 5.6K RC-11 SMD 0805 T
3782	232273061152	RST SM 0805 RC11 1K5 PM5 R
3783	232273061182	RES 1K8 0805 SMD
3784	232273061105	RES 1M RC-11 SMD 0805 T
3785	232273061102	RST SMC 0805 RC11 1K PM5 T
3786	232273061103	RES 10K RC-11 SMD 0805 T
3787	232273061332	RES 3K3 0805 SMD
3788	232273061101	RST SM 0805 RC11 100R PM5 R
3789	232273061101	RST SM 0805 RC11 100R PM5 R
3790	232273061103	RES 10K RC-11 SMD 0805 T
3791	232273061332	RES 3K3 0805 SMD

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Item	Code Number	Description
3792	232273464702	SMD RST 0805 4K7 PM1
3801	232273061472	RST SM 0805 RC11 4K7 PM5 R
3802	232273061562	RES 5.6K RC-11 SMD 0805 T
3803	232273061472	RST SM 0805 RC11 4K7 PM5 R
3804	232273061105	RES 1M RC-11 SMD 0805 T
3805	232273061103	RES 10K RC-11 SMD 0805 T
3806	232273061331	RST SM 0805 RC11 330R PM5 T
3807	232273061153	RST SM 0805 RC11 15K PM5 R
3808	232273061123	RES 12K RC-11 SMD 0805 T
3809	232273061224	RST SMD 0805 RC11 220K PM5 R
3811	232273061184	RST SMD 0805 RC11 180K PM5 T
3812	232273061684	RES 680K 0805 SMD
3813	232273061473	RST SM 0805 RC11 47K PM5 R
3815	232273061103	RES 10K RC-11 SMD 0805 T
3816	232273061102	RST SMC 0805 RC11 1K PM5 T
3821	232273061184	RST SMD 0805 RC11 180K PM5 T
3822	232273061684	RES 680K 0805 SMD
3823	232273061473	RST SM 0805 RC11 47K PM5 R
3825	232273061103	RES 10K RC-11 SMD 0805 T
3831	232273061184	RST SMD 0805 RC11 180K PM5 T
3832	232273061684	RES 680K 0805 SMD
3833	232273061473	RST SM 0805 RC11 47K PM5 R
3835	232273061103	RES 10K RC-11 SMD 0805 T
3836	232273061103	RES 10K RC-11 SMD 0805 T
3841	232273061103	RES 10K RC-11 SMD 0805 T
3842	232273061103	RES 10K RC-11 SMD 0805 T
3843	232273061103	RES 10K RC-11 SMD 0805 T
3844	232273061103	RES 10K RC-11 SMD 0805 T
3845	232273061101	RST SM 0805 RC11 100R PM5 R
3846	232273061101	RST SM 0805 RC11 100R PM5 R
3891	213811611004	RST MFLM MF50S A 100K PM1 A
3892	213811615603	RST MFLM MF50S A 56K PM1 A
3893	213811611503	RST MFLM MF50S A 15K PM1 A
3894	213811612003	RST MFLM MF50S A 20K PM1 A
3895	213811612403	RST MFLM MF50S A 24K PM1 A

Item	Code Number	Description
5001	242253597069	COIL 4U7 K 0305
5002	242253597069	COIL 4U7 K 0305
5003	242253597069	COIL 4U7 K 0305
5101▲	313816873611	LINE FILTER (HJC-K8259)
5102	313816874511	FERRITE BEAD+COIL C8BR6H6X9.2A
5103	313816874511	FERRITE BEAD+COIL C8BR6H6X9.2A
5104	242254940662	FERRITE BEAD 0.7UH
5130▲	313816874281	POWER TRANSFORMER-EE42
5301	242253597069	COIL 4U7 K 0305
5302	242253597069	COIL 4U7 K 0305
5501	313811879961	H/DRV. XFMR
5502	313816874061	BEAD BF30UTA-3.5X5X1B
5503	313816873551	LINEARITY COIL(54A-9050H)
5504	313816873541	LINEARITY COIL(54A-9049H)
5505	313816874061	BEAD BF30UTA-3.5X5X1B
5542	242253591023	CHOCK COIL 22UH
5543	313812874431	HOR.CENTERING TRAN.
5544	313811878951	H SHIFT CHOKE COIL
5545	313812874421	PUNK HEAD CHOKE
5601	313812874411	DAF TRANSFORMER
5670	242253597069	COIL 4U7 K 0305
5671▲	313816876541	L.O.T.
5672	242253591023	CHOCK COIL 22UH
5701	242253597069	COIL 4U7 K 0305
5702	313817876911	COIL 0.12UH PM10
5703	242254944197	BLM21P221SB-0805 SMD
5721	313817876911	COIL 0.12UH PM10
5722	242254944197	BLM21P221SB-0805 SMD
5731	313817876911	COIL 0.12UH PM10
5732	242254944197	BLM21P221SB-0805 SMD
5733	242254944197	BLM21P221SB-0805 SMD
5734	242253597069	COIL 4U7 K 0305
5735	242254944197	BLM21P221SB-0805 SMD
5736	242254944197	BLM21P221SB-0805 SMD
5737	242254944197	BLM21P221SB-0805 SMD
5760	313816874511	FERRITE BEAD+COIL C8BR6H6X9.2A
5761	242254944197	BLM21P221SB-0805 SMD
5762	242254944197	BLM21P221SB-0805 SMD
5763	242254944197	BLM21P221SB-0805 SMD
5764	242254944197	BLM21P221SB-0805 SMD
5765	242254944197	BLM21P221SB-0805 SMD
5766	242253597069	COIL 4U7 K 0305
5767	313816874511	FERRITE BEAD+COIL C8BR6H6X9.2A
5768	242254942026	IND FXD BEAD EMI 100MHZ 50E A
5781	242253597069	COIL 4U7 K 0305
5782	242253597069	COIL 4U7 K 0305
5783	313817878601	BEAD 0.7UH VERT.
5791	242253597069	COIL 4U7 K 0305
5801	242254944197	BLM21P221SB-0805 SMD
5891	242254944197	BLM21P221SB-0805 SMD

Item	Code Number	Description
6101	931900263671	BRIDGE GBU6J
6104	933703700133	DIO REC BYV26E A A
6109	319801027581	DIODE BZX79C 7V5
6111	319801021591	DIODE BZX79-C15 (UAW)
6112	933703700133	DIO REC BYV26E A A
6113	319801010071	DIODE BAV21 (UAW)
6114	319801010531	SMD DIODE BAV103
6115	319801010071	DIODE BAV21 (UAW)
6116	933751660683	DIODE RGP10D (GI)
6125	319801010011	DIODE 1N4148 (UAW)
6131	932212636682	DIODE 31DF6 6E
6132	319801021591	DIODE BZX79-C15 (UAW)
6133	932212636682	DIODE 31DF6 6E
6134	932208187683	DIODE BYW98-200
6135	932208187683	DIODE BYW98-200
6137	932208187683	DIODE BYW98-200
6139	932208187683	DIODE BYW98-200
6140	933890390682	DIO REC EGP20D
6144	933703700133	DIO REC BYV26E A A
6145	319801010071	DIODE BAV21 (UAW)
6152	319801026881	DIODE BZX79-C6V8 (UAW)
6160	933913910115	SMD DIODE BAS32L
6161	319801010071	DIODE BAV21 (UAW)
6162	319801010531	SMD DIODE BAV103
6191	933497950683	DIODE RGP10J (GI)
6192	319801010071	DIODE BAV21 (UAW)
6201	933166890113	DIODE BZX79-B12V
6202	932214729673	DIODE BZX55-B2V4 (UAW)
6203	319801010011	DIODE 1N4148 (UAW)
6204	319801010011	DIODE 1N4148 (UAW)
6205	319801010011	DIODE 1N4148 (UAW)
6206	319801010011	DIODE 1N4148 (UAW)
6207	319801025681	DIODE BZX79-C5V6 (UAW)
6208	319801025681	DIODE BZX79-C5V6 (UAW)
6301	933913910115	SMD DIODE BAS32L
6302	319801010011	DIODE 1N4148 (UAW)
6391	933215370215	SMD DIODE BAV99
6392	933215370215	SMD DIODE BAV99
6421	319801010011	DIODE 1N4148 (UAW)
6422	933957760683	DIODE SB140 (GI)
6423	933913910115	SMD DIODE BAS32L
6424	319801010011	DIODE 1N4148 (UAW)
6426	319801010011	DIODE 1N4148 (UAW)
6462	319801023091	DIODE BZX79C30V
6463	933913910115	SMD DIODE BAS32L
6464	319801025181	DIODE BZX79-C5V1 (UAW)
6491	319801010011	DIODE 1N4148 (UAW)
6492	319801010011	DIODE 1N4148 (UAW)
6501	933493960683	DIODE RGP10G (GI)
6502	933751660683	DIODE RGP10D (GI)
6503	319801010011	DIODE 1N4148 (UAW)
6506	933543490133	DIO REC BYV27-50
6507	933712740673	DIODE BZX79-B15
6508	932213602687	DIODE 5TUZ52C
6515	933703700133	DIO REC BYV26E A A
6540	933497950683	DIODE RGP10J (GI)
6541	319801010011	DIODE 1N4148 (UAW)
6542	319801010011	DIODE 1N4148 (UAW)
6543	932211574682	DIODE 31DF4

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Item	Code Number	Description
6544	933751660683	DIODE RGP10D (GI)
6545	933751660683	DIODE RGP10D (GI)
6566	319801010011	DIODE 1N4148 (UAW)
6567	933504400683	DIODE RGP15G (GI)
6601	933612320113	DIODE BY584
6602	319801021291	DIODE BZX79-C12 (UAW)
6603	933612320113	DIODE BY584
6621	319801010011	DIODE 1N4148 (UAW)
6622	319801025181	DIODE BZX79-C5V1 (UAW)
6651	933751660683	DIODE RGP10D (GI)
6652	319801025181	DIODE BZX79-C5V1 (UAW)
6653	933913910115	SMD DIODE BAS32L
6654	933913910115	SMD DIODE BAS32L
6655	319801025181	DIODE BZX79-C5V1 (UAW)
6671	933497950683	DIODE RGP10J (GI)
6672	932210388682	DIO REC 31DF6 A (INRO) B
6673	319801010011	DIODE 1N4148 (UAW)
6674	933612320113	DIODE BY584
6691	319801027591	DIODE BZX79-C75(UAW)
6701	319801010531	SMD DIODE BAV103
6702	319801010531	SMD DIODE BAV103
6703	319801010531	SMD DIODE BAV103
6704	319801010531	SMD DIODE BAV103
6705	933913910115	SMD DIODE BAS32L
6721	319801010531	SMD DIODE BAV103
6722	319801010531	SMD DIODE BAV103
6723	319801010531	SMD DIODE BAV103
6724	319801010531	SMD DIODE BAV103
6725	933913910115	SMD DIODE BAS32L
6731	933913910115	SMD DIODE BAS32L
6732	933215370215	SMD DIODE BAV99
6741	319801010531	SMD DIODE BAV103
6742	319801010531	SMD DIODE BAV103
6743	319801010531	SMD DIODE BAV103
6744	319801010531	SMD DIODE BAV103
6745	933913910115	SMD DIODE BAS32L
6761	933493960683	DIODE RGP10G (GI)
6762	319801023091	DIODE BZX79C30V
6801	933913910115	SMD DIODE BAS32L
6802	933913910115	SMD DIODE BAS32L
6803	933913910115	SMD DIODE BAS32L
6811	933137380215	Z.DIODE BZX84C4V7 SMD T
6812	933913910115	SMD DIODE BAS32L
6813	933215370215	SMD DIODE BAV99
6821	933137380215	Z.DIODE BZX84C4V7 SMD T
6822	933913910115	SMD DIODE BAS32L
6823	933215370215	SMD DIODE BAV99
6831	933137380215	Z.DIODE BZX84C4V7 SMD T
6832	933913910115	SMD DIODE BAS32L
6833	933215370215	SMD DIODE BAV99
6891	932214603682	LED L-3WYGW
7001	932214260682	IC AN5870K 30P
7111	319802043011	TRANS BF422 (UAW)
7121	932214576682	IC STRF6656 (LF1352)
7130▲	932214014667	PHOTOCOUPLER TCET1103G 4P
7140	933535800682	TRANS. BD438 B
7141	932209265685	TRAN MUN2211
7143	932209200687	IC L4940V5 3P
7144	933773970687	MOSFET IRF640
7146	934003960126	TRANS BSN254A
7147	932209265685	TRAN MUN2211
7148	319801042081	TRANS BC848C (UAW)
7151	319802043541	TRANS BC337-40 (UAW) R
7155	933771100686	IC TL431CLPRP 3P
7161	319802043561	TRANS BC338 (UAW)
7162	932209265685	TRAN MUN2211
7163	319801042081	TRANS BC848C (UAW)
7191	319802040161	TRANS BC558C (UAW)
7201	932213999682	IC LM61BIZ 3P
7203	933393510602	IC LM358N 8P (PHILIPS)
7204	933768130112	IC PCF8591P 16P
7205	935229830112	IC TDA8447/N1 16P

Item	Code Number	Description
7301	313817854161	109P2-OTP CPU ASSY
7302	319801042201	TRANS BC858C (UAW)
7303	319801042081	TRANS BC848C (UAW)
7336	932212662682	IC M24C16-BN6 8P
7363	933400610682	IC MC7812CT 3P
7364	933920810682	IC L7808CV 3P
7391	932209265685	TRAN MUN2211
7392	319801042201	TRANS BC858C (UAW)
7401	319802043461	TRANS BC328 (UAW)
7402	932209265685	TRAN MUN2211
7404	933282660652	IC HEF4053BP 16P
7421	935262332112	IC TDA4856/V2 32P
7422	319802043561	TRANS BC338 (UAW)
7423	319802043461	TRANS BC328 (UAW)
7424	932209265685	TRAN MUN2211
7425	319802040081	TRANS BC548C (UAW)
7426	319802040161	TRANS BC558C (UAW)
7427	319801042201	TRANS BC858C (UAW)
7461	933237780126	TRANS BC546B (UAW)
7462	319802040081	TRANS BC548C (UAW)
7463	319802040161	TRANS BC558C (UAW)
7464	319802043021	TRANS BF423 (UAW)
7465	319802043011	TRANS BF422 (UAW)
7466	932209265685	TRAN MUN2211
7491	932209898682	IC ST24LC21BB6 8P
7501	934000540115	TRANS BSP126
7502	932214442671	TRANS 2SC5445
7503	932205702687	TRANS BD533
7504	932205703687	TRANS BD534
7505	933393510602	IC LM358N 8P (PHILIPS)
7541	932211829687	FET POW 2SJ448
7542	932204822682	TRANS 2SC2344E (SANYO)
7543	932204823682	TRANS 2SA1011E
7544	319801042201	TRANS BC858C (UAW)
7545	319802043011	TRANS BF422 (UAW)
7566	932209265685	TRAN MUN2211
7567	931900234682	IC STV9379 7P
7586	933393510602	IC LM358N 8P (PHILIPS)
7587	319802043841	TRANS BC639 (UAW)
7588	319802043811	TRANS BC638 (UAW)
7601	933271570127	TRANSISTOR BUX87
7602	319801042081	TRANS BC848C (UAW)
7603	319801042081	TRANS BC848C (UAW)
7621	933773970687	MOSFET IRF640
7622	932214562667	TRAN SLA5058
7628	932209265685	TRAN MUN2211
7629	932209265685	TRAN MUN2211
7630	932209265685	TRAN MUN2211
7631	932209265685	TRAN MUN2211
7632	932209265685	TRAN MUN2211
7633	932209265685	TRAN MUN2211
7651	932212152682	IC L4990A 16P
7652	319802040081	TRANS BC548C (UAW)
7653	319801042201	TRANS BC858C (UAW)
7654	319801042081	TRANS BC848C (UAW)
7671	934003960126	TRANS BSN254A
7672	931900179687	IRF740 POWER MOS-FET
7673	932212460687	FET POW STU8NA80 (ST00) L
7674	319802040081	TRANS BC548C (UAW)
7701	935261628112	IC TDA4886A/V1 24P
7705	932213801667	IC LM2402T 11P
7706	319802043011	TRANS BF422 (UAW)
7707	319802043011	TRANS BF422 (UAW)
7726	319802043011	TRANS BF422 (UAW)
7727	319802043011	TRANS BF422 (UAW)
7746	319802043011	TRANS BF422 (UAW)
7747	319802043011	TRANS BF422 (UAW)
7781	823827435561	IC LSC4588P2
7782	932209265685	TRAN MUN2211
7783	932209265685	TRAN MUN2211
7801	932203171682	IC TL072CP 8P (TI)
7802	933669110652	IC 74HC4066N 14P
7803	319802043021	TRANS BF423 (UAW)

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Item	Code Number	Description
7804	319802043021	TRANS BF423 (UAW)
7805	319802043021	TRANS BF423 (UAW)
7806	933706060112	IC PCF8574P 16P
7807	319801042081	TRANS BC848C (UAW)
7808	319802043021	TRANS BF423 (UAW)
7809	319802043021	TRANS BF423 (UAW)
7810	319802043021	TRANS BF423 (UAW)
7891	823827434991	LM61BIM (SOT-23)

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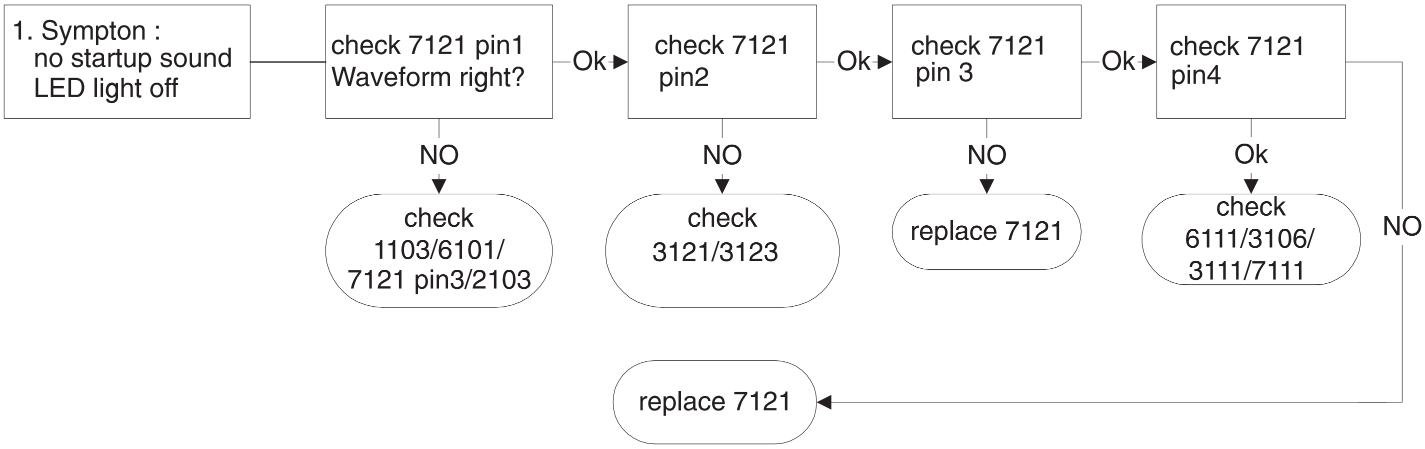
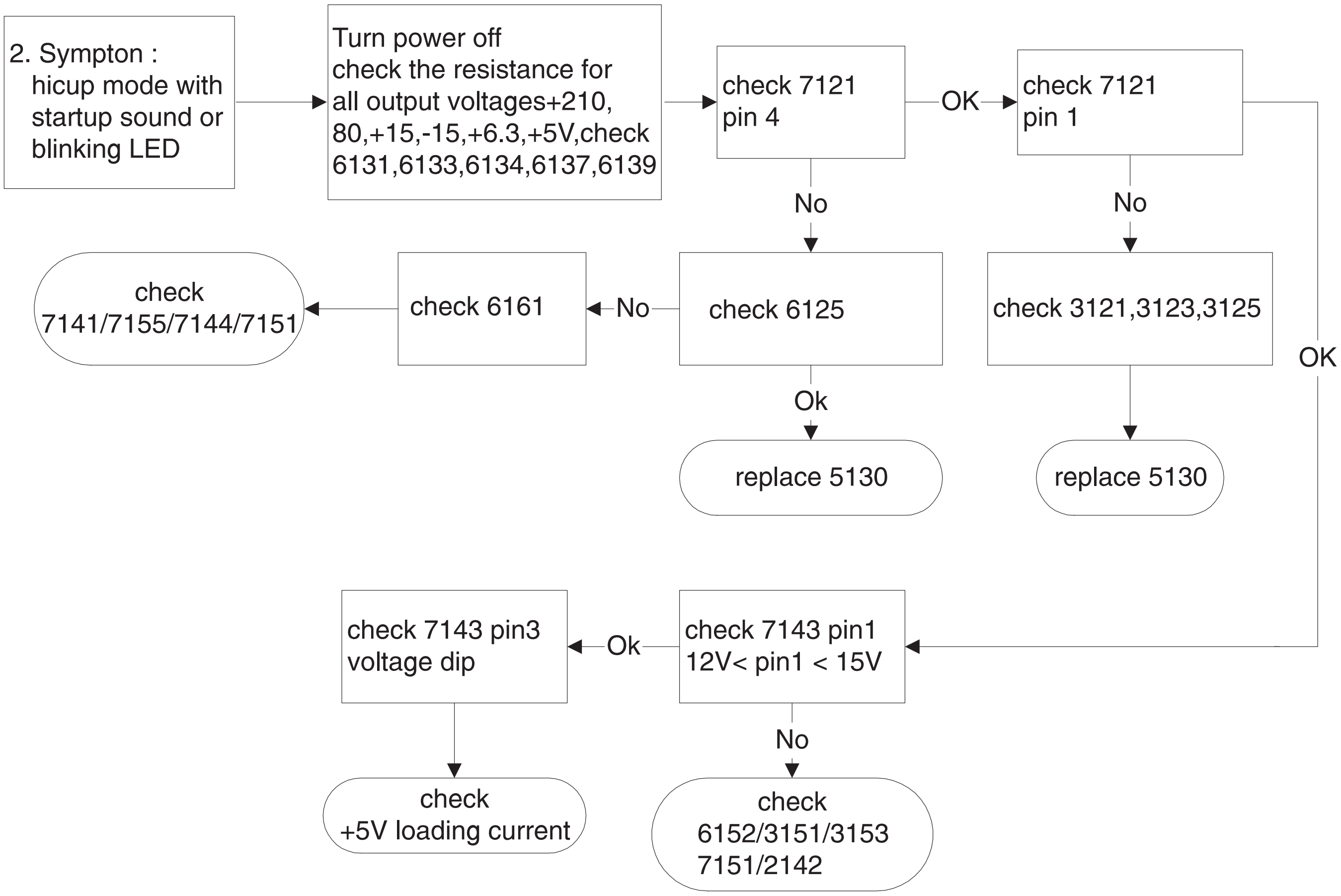
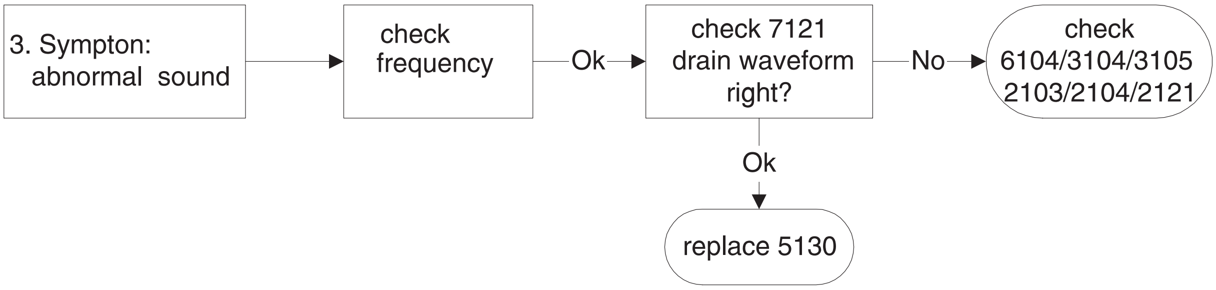
A. Power Supply Failure


1. Sympton :
no startup sound
LED light off
check 7121 pin1
Waveform right?
Ok
check 7121
pin2
Ok
check 7121
pin 3
Ok
check 7121
pin4
NO
check
1103/6101/
7121 pin3/2103
NO
check
3121/3123
NO
replace 7121
Ok
check
6111/3106/
3111/7111
NO
replace 7121


2. Sympton :
hicup mode with
startup sound or
blinking LED
Turn power off
check the resistance for
all output voltages+210,
80,+15,-15,+6.3,+5V,check
6131,6133,6134,6137,6139
check 7121
pin 4
OK
check 7121
pin 1
No
No
check
7141/7155/7144/7151
check 6161
No
check 6125
check 3121,3123,3125
OK
Ok
replace 5130
replace 5130
check 7143 pin3
voltage dip
Ok
check 7143 pin1
12V< pin1 < 15V
No
check
+5V loading current
check
6152/3151/3153
7151/2142


3. Sympton:
abnormal sound
check
frequency
Ok
check 7121
drain waveform
right?
No
check
6104/3104/3105
2103/2104/2121
Ok
replace 5130

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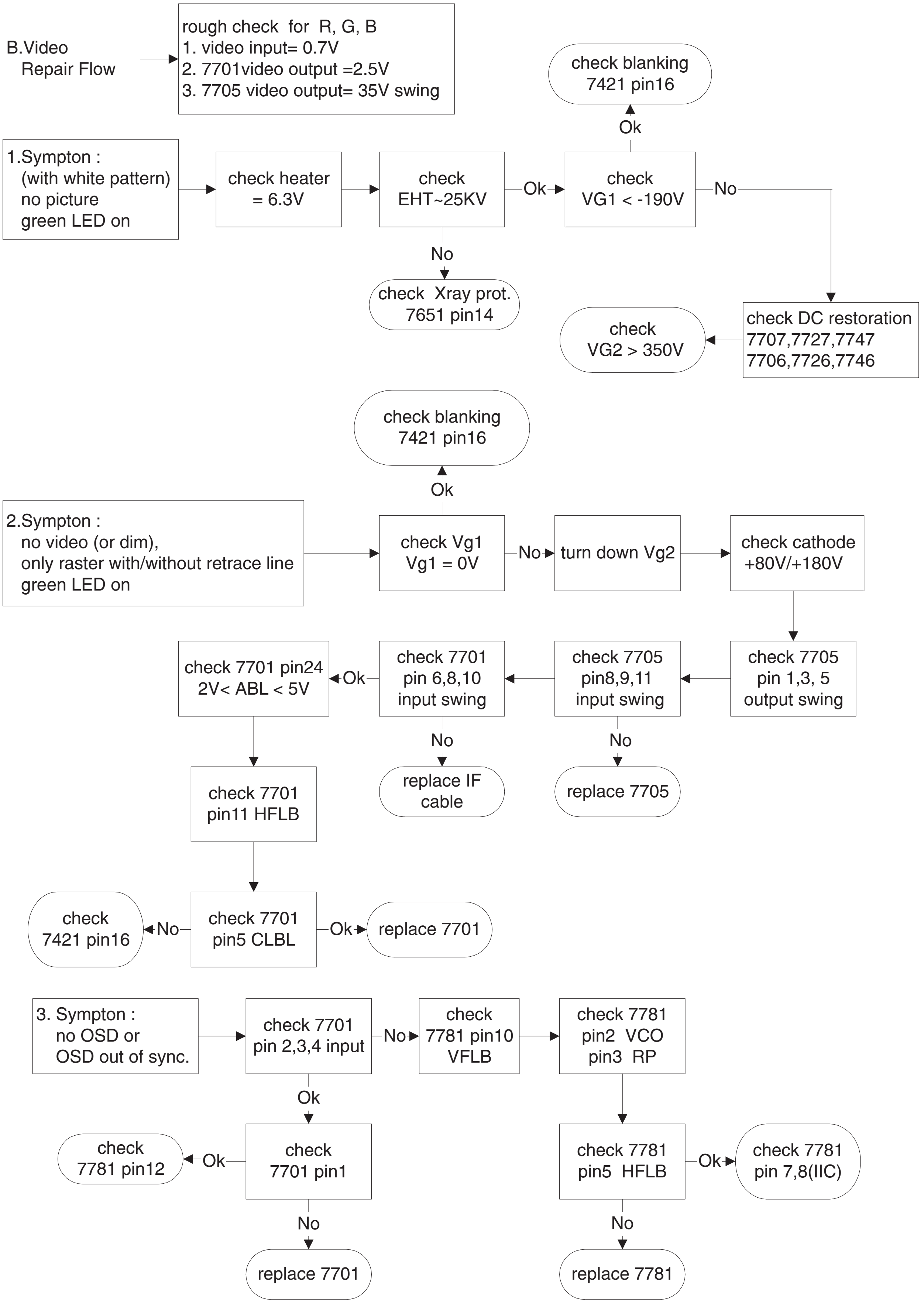
B.Video
Repair Flow
rough check for R, G, B
1. video input= 0.7V
2. 7701video output =2.5V
3. 7705 video output= 35V swing
1.Sympton :
(with white pattern)
no picture
green LED on
check heater
= 6.3V
check
EHT~25KV
Ok
check
VG1 < -190V
Ok
check blanking
7421 pin16
No
No
check Xray prot.
7651 pin14
check DC restoration
7707,7727,7747
7706,7726,7746
check
VG2 > 350V
2.Sympton :
no video (or dim),
only raster with/without retrace line
green LED on
check Vg1
Vg1 = 0V
Ok
check blanking
7421 pin16
No
turn down Vg2
check cathode
+80V/+180V
check 7705
pin 1,3, 5
output swing
check 7705
pin8,9,11
input swing
No
replace 7705
check 7701
pin 6,8,10
input swing
No
replace IF
cable
Ok
check 7701 pin24
2V< ABL < 5V
check 7701
pin11 HFLB
check 7701
pin5 CLBL
No
check
7421 pin16
Ok
replace 7701
3. Sympton :
no OSD or
OSD out of sync.
check 7701
pin 2,3,4 input
No
check
7781 pin10
VFLB
check 7781
pin2 VCO
pin3 RP
check 7781
pin5 HFLB
Ok
check 7781
pin 7,8(IIC)
No
replace 7781
Ok
check
7701 pin1
Ok
check
7781 pin12
No
replace 7701

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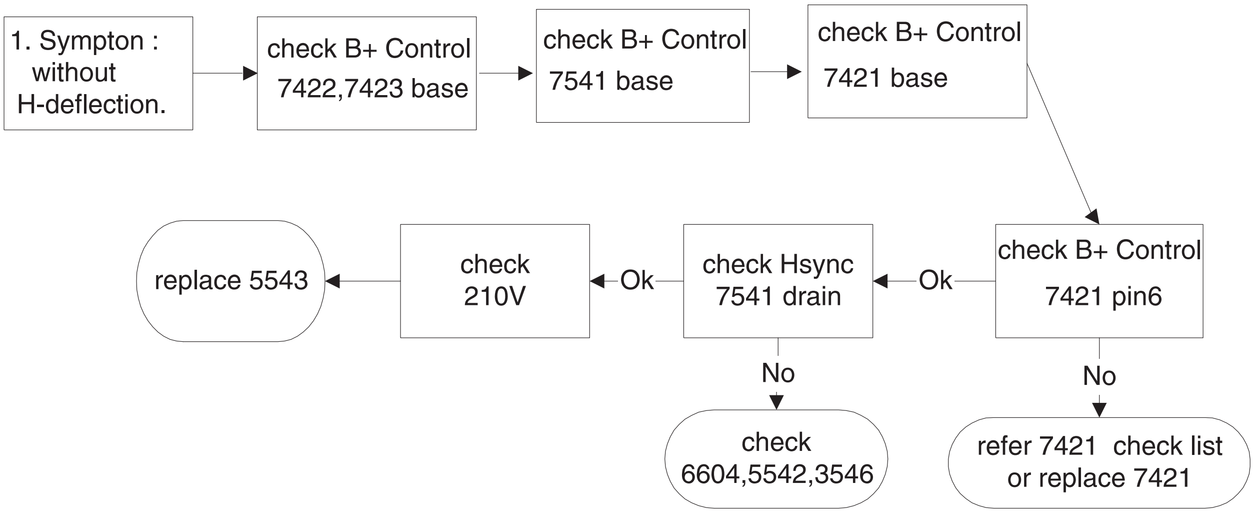
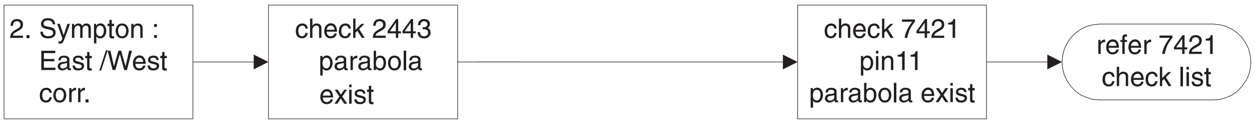
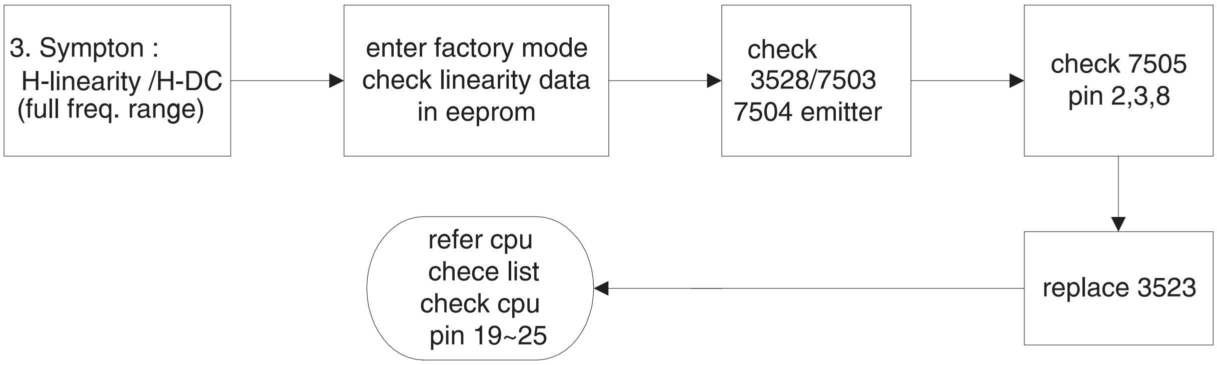
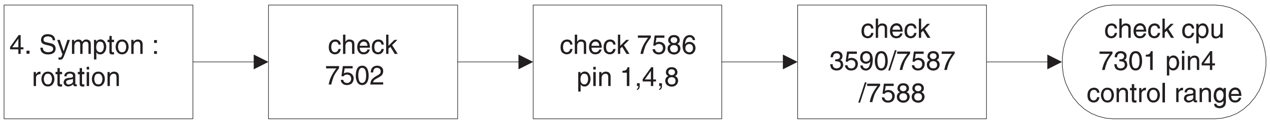
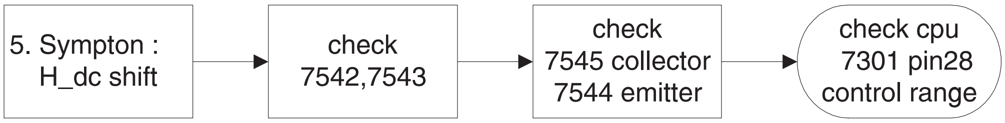
C. Horizontal deflection
output repair flow :

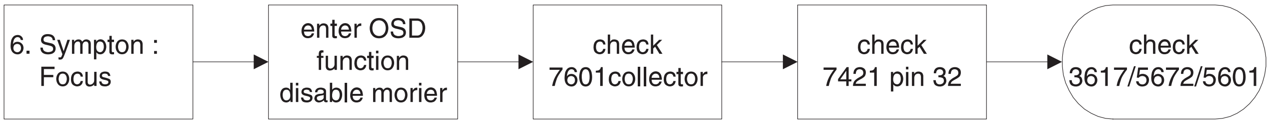

1. Sympton : without H-deflection.
check B+ Control 7422,7423 base
check B+ Control 7541 base
check B+ Control 7421 base
check B+ Control 7421 pin6
Ok
check Hsync 7541 drain
Ok
check 210V
replace 5543
No
check 6604,5542,3546
No
refer 7421 check list or replace 7421


2. Sympton : East /West corr.
check 2443 parabola exist
check 7421 pin11 parabola exist
refer 7421 check list


3. Sympton : H-linearity /H-DC (full freq. range)
enter factory mode check linearity data in eeprom
check 3528/7503 7504 emitter
check 7505 pin 2,3,8
replace 3523
refer cpu chece list check cpu pin 19~25


4. Sympton : rotation
check 7502
check 7586 pin 1,4,8
check 3590/7587 /7588
check cpu 7301 pin4 control range


5. Sympton : H_dc shift
check 7542,7543
check 7545 collector 7544 emitter
check cpu 7301 pin28 control range


6. Sympton : Focus
enter OSD function disable morier
check 7601collector
check 7421 pin 32
check 3617/5672/5601

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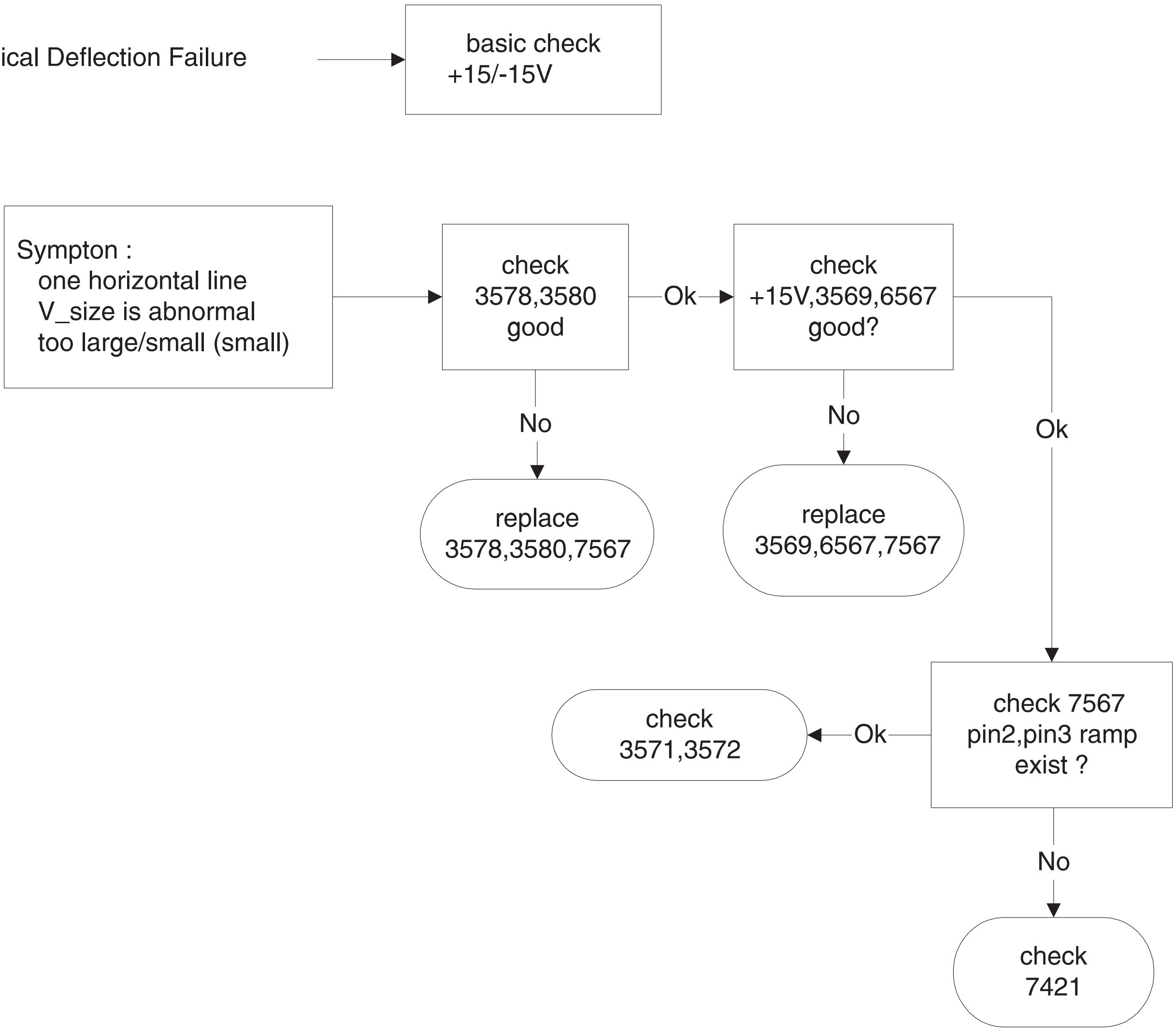
D. Vertical Deflection Failure


basic check
+15/-15V
Sympton :
one horizontal line
V_size is abnormal
too large/small (small)
check
3578,3580
good
Ok
check
+15V,3569,6567
good?
No
replace
3578,3580,7567
No
replace
3569,6567,7567
Ok
check 7567
pin2,pin3 ramp
exist ?
Ok
check
3571,3572
No
check
7421

Repair Flow Chart

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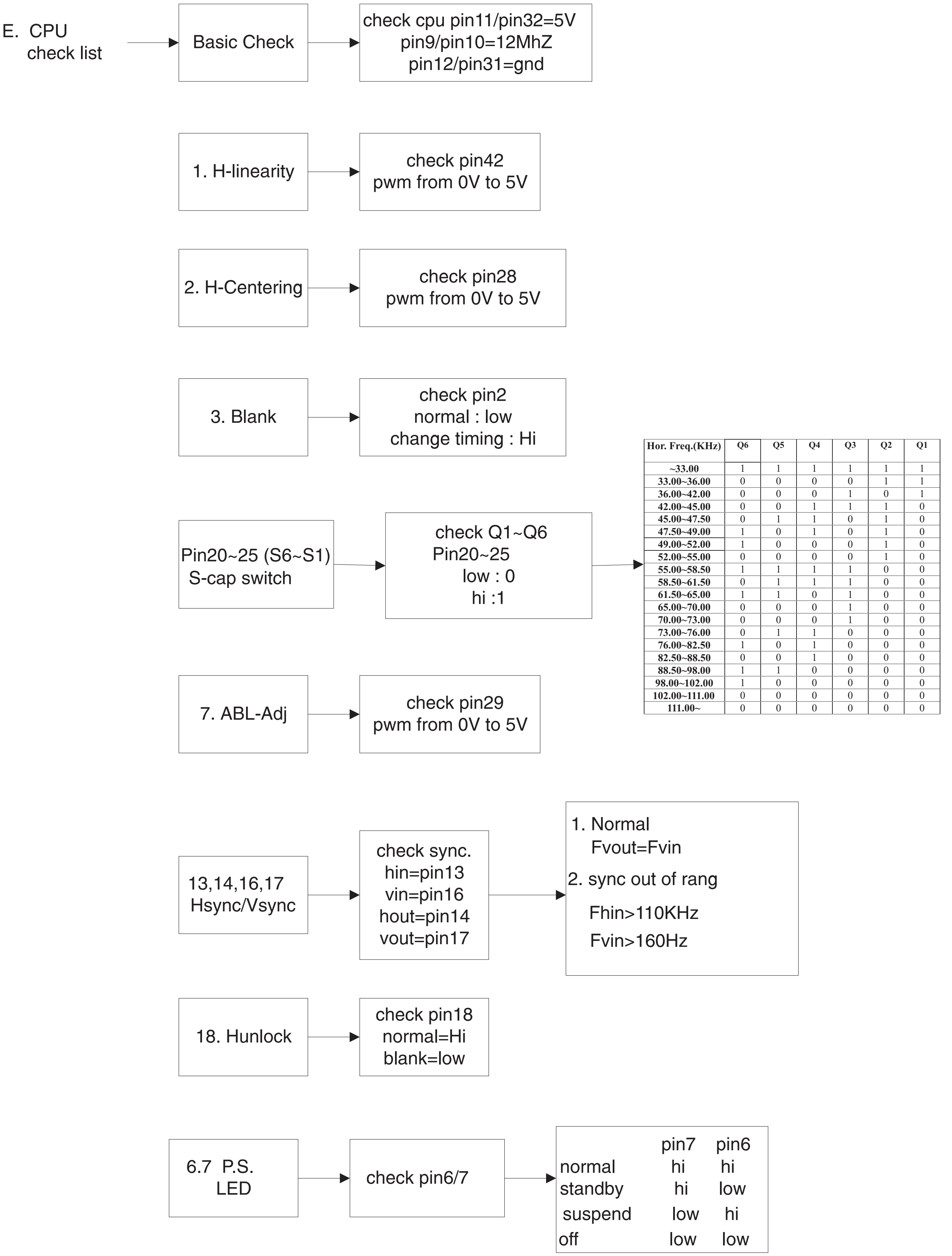
E. CPU
check list
Basic Check
check cpu pin11/pin32=5V
pin9/pin10=12MhZ
pin12/pin31=gnd
1. H-linearity
check pin42
pwm from 0V to 5V
2. H-Centering
check pin28
pwm from 0V to 5V
3. Blank
check pin2
normal : low
change timing : Hi
Pin20~25 (S6~S1)
S-cap switch
check Q1~Q6
Pin20~25
low : 0
hi :1
7. ABL-Adj
check pin29
pwm from 0V to 5V
13,14,16,17
Hsync/Vsync
check sync.
hin=pin13
vin=pin16
hout=pin14
vout=pin17
1. Normal
Fvout=Fvin
2. sync out of rang
Fhin>110KHz
Fvin>160Hz
18. Hunlock
check pin18
normal=Hi
blank=low
6.7 P.S.
LED
check pin6/7

Hor. Freq.(KHz)	Q6	Q5	Q4	Q3	Q2	Q1
~33.00	1	1	1	1	1	1
33.00~36.00	0	0	0	0	1	1
36.00~42.00	0	0	0	1	0	1
42.00~45.00	0	0	1	1	1	0
45.00~47.50	0	1	1	0	1	0
47.50~49.00	1	0	1	0	1	0
49.00~52.00	1	0	0	0	1	0
52.00~55.00	0	0	0	0	1	0
55.00~58.50	1	1	1	1	0	0
58.50~61.50	0	1	1	1	0	0
61.50~65.00	1	1	0	1	0	0
65.00~70.00	0	0	0	1	0	0
70.00~73.00	0	0	0	1	0	0
73.00~76.00	0	1	1	0	0	0
76.00~82.50	1	0	1	0	0	0
82.50~88.50	0	0	1	0	0	0
88.50~98.00	1	1	0	0	0	0
98.00~102.00	1	0	0	0	0	0
102.00~111.00	0	0	0	0	0	0
111.00~	0	0	0	0	0	0

	pin7	pin6
normal	hi	hi
standby	hi	low
suspend	low	hi
off	low	low

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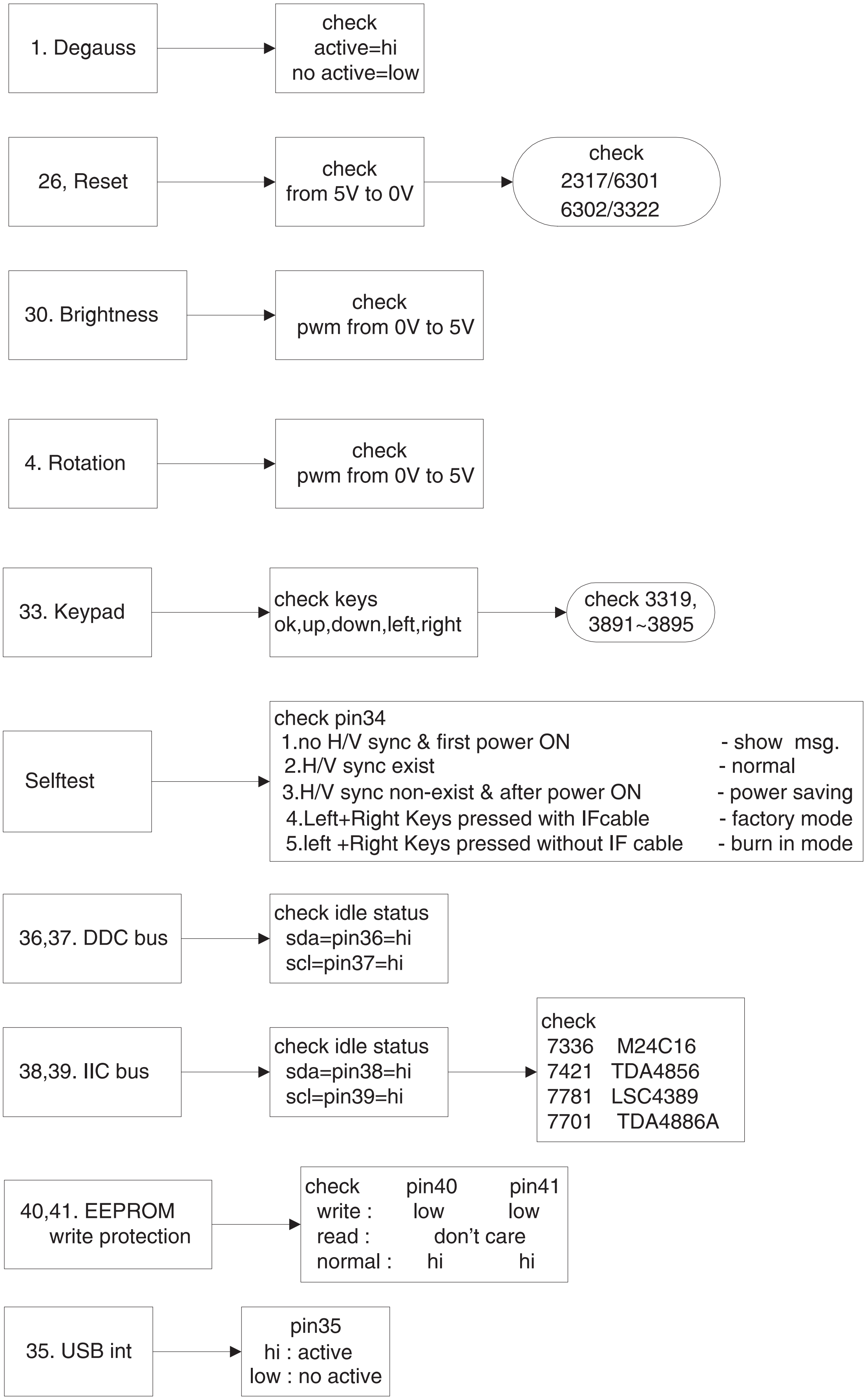
1. Degauss
check
active=hi
no active=low
26, Reset
check
from 5V to 0V
check
2317/6301
6302/3322
30. Brightness
check
pwm from 0V to 5V
4. Rotation
check
pwm from 0V to 5V
33. Keypad
check keys
ok,up,down,left,right
check 3319,
3891~3895
Selftest
check pin34
1.no H/V sync & first power ON - show msg.
2.H/V sync exist - normal
3.H/V sync non-exist & after power ON - power saving
4.Left+Right Keys pressed with IFcable - factory mode
5.left +Right Keys pressed without IF cable - burn in mode
36,37. DDC bus
check idle status
sda=pin36=hi
scl=pin37=hi
38,39. IIC bus
check idle status
sda=pin38=hi
scl=pin39=hi
check
7336 M24C16
7421 TDA4856
7781 LSC4389
7701 TDA4886A
40,41. EEPROM
write protection
check pin40 pin41
write : low low
read : don't care
normal : hi hi
35. USB int
pin35
hi : active
low : no active

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Repair Flow Chart

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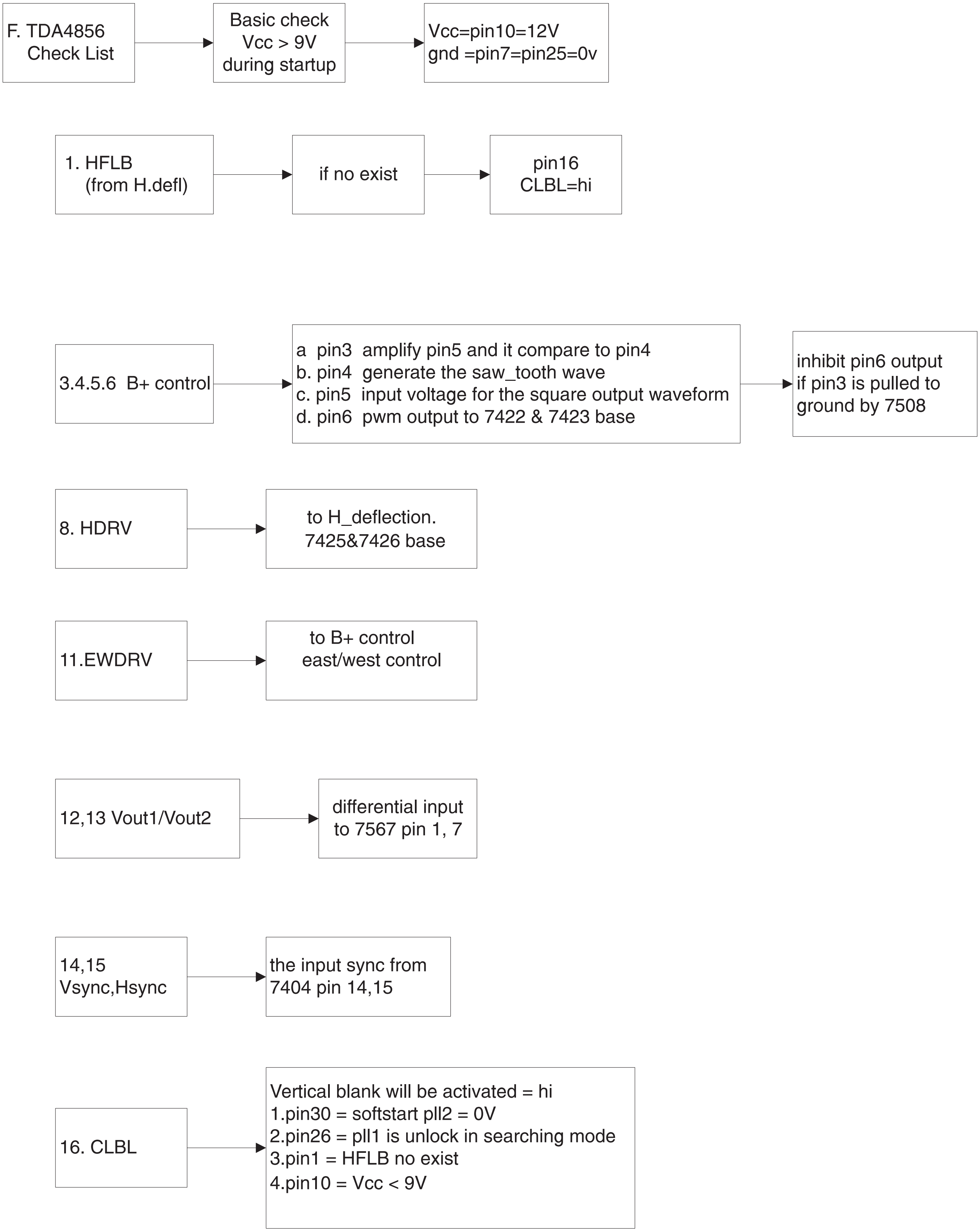

F. TDA4856 Check List
Basic check Vcc > 9V during startup
Vcc=pin10=12V
gnd =pin7=pin25=0v

1. HFLB (from H.defl)
if no exist
pin16 CLBL=hi

3.4.5.6 B+ control
a pin3 amplify pin5 and it compare to pin4
b. pin4 generate the saw_tooth wave
c. pin5 input voltage for the square output waveform
d. pin6 pwm output to 7422 & 7423 base
inhibit pin6 output if pin3 is pulled to ground by 7508

8. HDRV
to H_deflection. 7425&7426 base

11.EWDRV
to B+ control east/west control

12,13 Vout1/Vout2
differential input to 7567 pin 1, 7

14,15 Vsync,Hsync
the input sync from 7404 pin 14,15

16. CLBL
Vertical blank will be activated = hi
1.pin30 = softstart pll2 = 0V
2.pin26 = pll1 is unlock in searching mode
3.pin1 = HFLB no exist
4.pin10 = Vcc < 9V

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Repair Flow Chart

17. Hunlock → Hunlock pin is floating while pll1(pin26) is unlock in searching mode

18. IIC SCL = hi
19 IIC SDA = hi → initial fail could be these of IC 7421,7701,7781,7336

20 asymmetry EW output → to 7503 pin30 for soft start

21 EHT_compen. → compensate for the V_size owing the load variation

22,23,24 VAGC,VREF,VCAP → pin22 determin the AGC pin23,pin24 determin frequency → 50Hz< freq. <160Hz

26,27,28,29 Hpll1,Hbuf,Href, Hcap → pin26 determin the pll1 loop filter pin 27,28,29 H-Freq working range → 30K<freq.<110KHz

30. PLL2 → 1.compare the HFLBand control the phase of HDRV 2.softstart

31 EHT_compen. → compensate for the H_size owing the load variation

32. Focus → to 7603 for the V dynamic focus

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CM25+ 109P2
GENERAL PRODUCT SPECIFICATION

. MICRO PROCESSOR-BASED DIGITAL CONTROL WITH 7 FACTORY PRESETS AND 36 USER MODES TO ENSURE PICTURE CONFIGURATIONS ARE ALWAYS MAINTAINED WHEN SWITCH BETWEEN COMMON VIDEO MODES AND USER DEFINED CUSTOM MODES.

. USER FRIENDLY OSD DISPLAY FOR MODE IDENTIFICATION/ADJUSTMENT

. DDC1/ 2B COMMUNICATION CAPABILITY

. MAX. RESOLUTION 1920 X 1440 NON-INTERLACED AT 60 HZ

. 19" 0.24 MM AG MASK NF PICTURE TUBE

. EASY TILT & SWIVEL BASE

. FULL RANGE POWER SUPPLY 90 - 264 VAC

. CE ENVIRONMENTAL POLICY with MHR (Option)

. FLAT SQUARE TUBE TO REDUCE LIGHT REFLECTION

. POWER MANAGEMENT CAPABILITY

  . LOW EMISSION TCO 99

  . MOIRE' CANCELLATION

. AUTO CALIBRATION FUNCTION

CLASS NO.
00-08-01

19" AUTO SCAN CMTR

TYPE : 109P20/00C-CM25+109P2
BRAND : PHILIPS

8639 000 10535

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1.0 FOREWORD

This specification describes a 19" high resolution digitally controlled auto-scan color monitor with max. resolution up to 1920x1440/60Hz non-interlaced.

2.0 PRODUCT PROFILE

This display monitor unit is a complete color display monitor enclosed in PHILIPS global styling cabinet which has an integrated tilt and swivel base.

2.1 CRT

Type NR. : M46LRY22X21 (MITSUBISHI)
Dimensions : 19 NF
Phosphor Pitch : 0.24 mm
Phosphor : B22
Mask : AG
Deflection angle : 90 deg
Light transmission : 40%
Surface of plate : AR Film
EHT : 25.0 KV
Useful screen (mm) : 366.2 X 274.6

2.2 Scanning frequencies

Hor. : 30 - 111KHz Ver. : 50 - 160 Hz

2.3 Video dot rate : 261MHz

2.4 Power input : 90 - 264 Vac, 47-63 Hz

2.5 Power consumption : 125 W Typ.

2.6 Dimensions : 456(W) x 467(H) x 437.6(D) mm

2.7 Weight : 24.5 Kg

2.8 Functions :

(1) R/G/B separate analog inputs, H/V composite sync, sync. on green.
(2) Automatic (Power on) and manual degaussing circuit.

2.9 Ambient temperature : 0 - 35 C

CLASS NO.
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19" AUTO SCAN CMTR

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BRAND : PHILIPS

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GENERAL PRODUCT SPECIFICATION

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2.10 Regulatory compliance :

(1) Safety : UL 1950
: CSA C22.2 NO. 950
: IEC950/ EN60950

(2) EMI : FCC PART 15 class B
: D.O.C. Class B
: EN55022 Class B
: CE mark
: CNS 13438

(3) X-RAY Radiation requirement / regulation
: DHHS 21 CFR Subchapter J.
: ROEV / 08.01.1987

(4) Low Radiation
: TCO99

(5) Environmental
: Per CE and BU policy

(6) Ergonomic Requirements
: ZH 1/618
: EN 9241-3 / ISO 9241-3 (7/92) / ISO 9241-8

3.0 Electrical characteristics

3.1 Interface signals

The input signals can be applied in two different modes :

1). Video, Hsync., Vsync.
2). Video, Composite Sync

Video : 0.7 Vp-p, input impedance, 75 ohm

Sync. :	Separate sync	TTL level, input impedance 2k2 ohm
	Hor. sync	Positive/Negative
	Ver. sync	Positive/Negative
	Composite sync	TTL level, input impedance 2k2 ohm Positive/Negative

CLASS NO.	19" AUTO SCAN CMTR	8639 000 10535	
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3.2 Interface

3.2.1 Cable

The input signals are applied to the display through a detachable shielded cable.

Length : 1.5 m +/- 50 mm (detachable)

Connector type : 15 pin D-Sub male to 15 pin D-Sub male, blue
IBM PS/2 standard (3 rows)
with DDC1/ 2B pin assignments

pin assignments :

pin number	
1	Red video input
2	Green video input / Sync on green
3	Blue video input
4	Optional - connected to pin 10
5	Not connected
6	Red video ground
7	Green video ground
8	Blue video ground
9	+5V
10	Sync ground
11	Optional - connected to pin 10
12	Bi-directional data (SDA)
13	H/H+V sync
14	V sync (VCLK)
15	Data clock (SCL)

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3.2.2 Adaptor 15 pin D-standard (2 rows male) to 15 pin D-sub (female) for Apple MacIntosh II use.(Option)

pin assignments :

pin no	15 Pin D-standard
1	RED GND
2	RED VIDEO
3	COMPOSITE SYNC
4	SYNC GND
5	GREEN VIDEO
6	GREEN GND
7	NC
8	NC
9	BLUE VIDEO
10	NC
11	NC
12	NC
13	BLUE GND
14	NC
15	NC

CLASS NO.

00-08-01

19" AUTO SCAN CMTR

TYPE : 109P20/00C-CM25+109P2
BRAND : PHILIPS

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3.2.3 Software control functions via OSD/control

- Adjustable functions:

Main Controls
Language
Zoom
Adjust horizontal
Adjust vertical
Adjust shape
Adjust color
Reset to factory settings
Extra Controls

Close Main Controls

Move selection then

Language
-Language : multi-language(at least 5 language)

Input

-Input signal selection

Zoom
- Zoom

Adjust horizontal
-Adjust position
-Adjust size

Adjust vertical
-Adjust position
-Adjust size

Adjust shape
-Adjust side curve
Pincushion
Balanced
-Adjust side angles
Trapezoid
Parallelogram
-Rotate image
Rotate

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Adjust color
- -9300K for general use
- -6500K for image management
- -5500K for photoretouch
- User preset

Reset to factory settings
- No
- Yes

Extra **Controls**

Adjust moire
Horizontal

!

degauss

-Adjust convergence
Horizontal
Vertical

-Adjust purity
Top left
Top right
Bottom left
Bottom right

-Auto calibrate

3.3 Timing requirement

3.3.1 Mode storing capacity

Total modes available : 52
(1) Factory modes : 36 (Including 7 preset mode)
(2) User modes : 16

3.3.2 Factory preset timings

The factory settings of size and centering are according to the reference timing charts (see fig-8, fig-9)

MODE NO.	1	2	3	4
RESOLUTION	640 x 350	640 x 480	720 x 400	640 x 480
Dot clock(MHz)	25.175	25.175	28.321	31.500
f h	31.469 kHz	31.469 kHz	31.468 kHz	37.500 KHz
A (us)	31.778	31.778	31.778	26.667
B (us)	3.813	3.813	3.813	2.032
C (us)	1.907	1.907	1.907	3.810
D (us)	25.422	25.422	25.423	20.317
E (us)	0.636	0.636	0.325	0.508
f v	70.087 Hz	59.941 Hz	70.084 Hz	75.000 Hz
O (ms)	14.268	16.683	14.268	13.333
P (ms)	0.064	0.064	0.064	0.080
Q (ms)	1.907	1.049	1.112	0.427
R (ms)	11.122	15.253	12.711	12.800
S (ms)	1.175	0.317	0.382	0.026
SYNC. H/V POLARITY	+/ -	- / -	- /+	- /-
SEP . SYNC	Y	Y	Y	Y

MODE NO.	5	6	7	8
RESOLUTION	640 x 480	640x350	800x600	720x400
Dot clock(MHz)	31.500	31.500	40.000	35.500
f h	37.861 kHz	37.861 kHz	37.879 kHz	37.927 kHz
A (us)	26.413	26.413	26.400	26.366
B (us)	1.270	2.032	3.200	2.028
C (us)	3.810	3.048	2.200	3.042
D (us)	20.317	20.317	20.000	20.282
E (us)	1.016	1.016	1.000	1.014
f v	72.810 Hz	85.081 Hz	60.317Hz	85.039 Hz
O (ms)	13.735	11.754	16.579	11.759
P (ms)	0.079	0.079	0.106	0.079
Q (ms)	0.528	1.585	0.607	1.107
R (ms)	12.678	9.245	15.840	10.546
S (ms)	0.45	0.845	0.026	0.027
SYNC. H/V POLARITY	- / -	+ /-	+ / +	- / +
SEP . SYNC	Y	Y	Y	Y

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MODE NO.	9	10	11	12
RESOLUTION	640 x 480	800 x 600	800 x 600	1024 x 768
Dot clock(MHz)	36.000	49.500	50.000	65.000
f h	43.269 kHz	46.875 kHz	48.077 kHz	48.363 kHz
A (us)	23.111	21.333	20.800	20.677
B (us)	1.556	1.616	2.400	2.092
C (us)	2.222	3.232	1.280	2.462
D (us)	17.778	16.162	16.000	15.754
E (us)	1.555	0.323	1.12	0.369
f v	85.008 Hz	75.000 Hz	72.188 Hz	60.004 Hz
O (ms)	11.763	13.333	13.853	16.666
P (ms)	0.069	0.064	0.125	0.124
Q (ms)	0.578	0.448	0.478	0.600
R (ms)	11.093	12.800	12.480	15.880
S (ms)	0.023	0.021	0.77	0.062
SYNC. H/V POLARITY	- / -	+ / +	+ / +	- / -
SEP . SYNC	Y	Y	Y	Y

MODE NO.	13	14	15	16
RESOLUTION	832 x 624	640 x 480	800 x 600	1024 x 768
Dot clock(MHz)	57.280	40.500	56.250	75.000
f h	49.722 kHz	50.628 kHz	53.674 kHz	56.476 kHz
A (us)	20.110	19.752	18.631	17.707
B (us)	1.117	1.580	1.138	1.813
C (us)	3.910	1.975	2.702	1.920
D (us)	14.520	15.802	14.222	13.653
E (us)	0.563	0.395	0.569	0.321
f v	74.546 Hz	100.10 Hz	85.061 Hz	70.069 Hz
O (ms)	13.410	9.995	11.756	14.272
P (ms)	0.060	0.059	0.056	0.016
Q (ms)	0.784	0.435	0.503	0.513
R (ms)	12.550	9.481	11.179	13.599
S (ms)	0.016	0.020	0.018	0.054
SYNC. H/V POLARITY	+ /+	- / -	+ / +	- / -
SEP . SYNC	Y	Y	Y	Y

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MODE NO.	17	18	19	20
RESOLUTION	1280 x 960	1024 x 768	800 x 600	1280 x 1024
Dot clock(MHz)	108.000	78.750	67.500	108.000
f h	60.000 kHz	60.023 kHz	63.923 kHz	63.981 kHz
A (us)	16.667	16.660	15.644	15.630
B (us)	1.037	1.219	0.948	1.037
C (us)	2.889	2.235	2.370	2.296
D (us)	11.852	13.003	11.852	11.852
E (us)	0.889	0.203	0.474	0.445
f v	60.000 Hz	75.029 Hz	100.00 Hz	60.020 Hz
O (ms)	16.667	13.328	9.997	16.661
P (ms)	0.050	0.050	0.047	0.047
Q (ms)	0.600	0.466	0.548	0.594
R (ms)	16.000	12.795	9.387	16.005
S (ms)	0.017	0.017	0.015	0.015
SYNC. H/V POLARITY	+ / +	+ / +	+ / +	+ / +
SEP . SYNC	Y	Y	Y	Y

MODE NO.	21	22	23	24
RESOLUTION	1152 x 864	1024 x 768	1152 x 870	1152 x 900
Dot clock(MHz)	108.000	94.500	100.000	108.000
f h	67.500 kHz	68.677 kHz	68.681 kHz	71.809 kHz
A (us)	14.815	14.561	14.560	13.926
B (us)	1.185	1.016	1.280	0.593
C (us)	2.370	2.201	1.440	2.519
D (us)	10.667	10.836	11.520	10.667
E (us)	0.593	0.508	0.32	0.147
f v	75.000 Hz	84.997 Hz	74.979 Hz	76.150 Hz
O (ms)	13.333	11.765	13.333	13.132
P (ms)	0.044	0.044	0.044	0.111
Q (ms)	0.474	0.524	0.568	0.460
R (ms)	12.800	11.183	12.678	12.533
S (ms)	0.015	0.014	0.043	0.028
SYNC. H/V POLARITY	+ /+	+ / +	- / -	+ / +
SEP . SYNC	Y	Y	Y	Y

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MODE NO.	25	26	27	28
RESOLUTION	1600 x 1200	1280 x1024	1600 x 1200	1792 x 1344
Dot clock(MHz)	162.000	135.00	175.500	204.750
f h	75.000 kHz	79.976 kHz	81.250 kHz	83.640 kHz
A (us)	13.333	12.504	12.308	11.956
B (us)	1.185	1.067	1.094	0.977
C (us)	1.877	1.837	1.732	1.602
D (us)	9.877	9.481	9.117	8.752
E (us)	0.394	0.119	0.365	0.625
f v	60.000 Hz	75.024 Hz	65.000 Hz	59.999 Hz
O (ms)	16.667	13.329	15.385	16.667
P (ms)	0.040	0.038	0.037	0.036
Q (ms)	0.613	0.475	0.566	0.550
R (ms)	16.000	12.804	14.769	16.069
S (ms)	0.014	0.012	0.013	0.012
SYNC. H/V POLARITY	+ / +	+ / +	+ / +	+ / +
SEP . SYNC	Y	Y	Y	Y

MODE NO.	29	30	31	32
RESOLUTION	1280 x 960	1856 x 1392	1600 x 1200	1920 x 1440
Dot clock(MHz)	148.500	218.250	189.000	234.000
f h	85.938 kHz	86.333 kHz	87.500 kHz	90.000 kHz
A (us)	11.636	11.583	11.429	11.111
B (us)	1.077	1.026	1.016	0.889
C (us)	1.508	1.489	1.608	1.470
D (us)	8.620	8.504	8.466	8.205
E (us)	0.431	0.564	0.339	0.547
f v	85.002 Hz	59.995 Hz	70.000 Hz	60.000 Hz
O (ms)	11.764	16.668	14.286	16.667
P (ms)	0.035	0.035	0.034	0.033
Q (ms)	0.547	0.498	0.526	0.622
R (ms)	11.171	16.124	13.715	16.000
S (ms)	0.011	0.011	0.011	0.012
SYNC. H/V POLARITY	+ /+	+ / +	+ / +	+ / +
SEP . SYNC	Y	Y	Y	Y

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MODE NO.	33	34	35	36
RESOLUTION	1280 x 1024	1600 x 1200	1600 x 1200	1792 x 1344
Dot clock(MHz)	157.500	202.500	229.500	261.000
f h	91.146 kHz	93.750 kHz	106.250 kHz	106.270 kHz
A (us)	10.971	10.667	9.412	9.410
B (us)	1.016	0.948	0.837	0.828
C (us)	1.422	1.501	1.325	1.349
D (us)	8.127	7.901	6.972	6.866
E (us)	0.406	0.317	0.278	0.367
f v	85.024 Hz	75.000 Hz	85.000 Hz	74.997 Hz
O (ms)	11.761	13.334	11.765	13.334
P (ms)	0.033	0.032	0.028	0.028
Q (ms)	0.483	0.491	0.433	0.649
R (ms)	11.234	12.800	11.294	12.647
S (ms)	0.011	0.011	0.01	0.01
SYNC. H/V POLARITY	+ / +	+ / +	+ / +	+ / +
SEP . SYNC	Y	Y	Y	Y

3.3.3 Horizontal scanning

Sync polarity	: Positive or Negative
Scanning frequency	: 30 - 111 KHz
Retrace time	: 1.8 μsec (typical)

3.3.4 Vertical scanning

Sync polarity	: Positive or Negative
Scanning frequency	: 50 - 160 Hz

3.4 Power input connection

Power cord length	: 1.5 M
Power cord type	: 3 leads detachable power cord with protective earth plug.

3.5 Video amplifiers

Rise time/Fall time : 4.0 / 4.5 ns
(excluding rise/fall time due to test pattern & test probe)
Overshoot/undershoot : Max. 12%
Black level shift : Max. 3%
Sag : Max. 5%

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3.6 Degaussing

An automatic degaussing circuit is provided and required no intervention. The degaussing is activated at the time of switch-on and power saving wake up or switch-on again after switched-off for longer than 30 minutes. Manual degaussing is provided to eliminate any color impurity.

3.7 Requirement for low emission

(1) Electro static potential : < 0.5 KV
(2) Alternating Elec. field

ELF 5 - 2 Khz : 10.0 V/M
VLF 2 - 400 KHz : 1.0 V/M

(3) Magnetic field

ELF 5 - 2 Khz : 200 nT
VLF 2 - 400 Khz : 25 nT

3.8 Power management

The power consumption and the status indication of the set with power management function are as follows,

STATUS	Horizontal	Vertical	Power Spec	LED
On	Pulse	Pulse	as normal on	Green
Stand-by	No Pulse	Pulse	< 10 W	Yellow
Suspend	Pulse	No Pulse	< 10 W	Yellow
Power off	No Pulse	No Pulse	< 3 W	Amber

Entering from ON state to Power saving state must has 5 - 10 second time delay. It must awake from Suspend state to On state within 3 seconds.

According to VESA power saving signalling.
TCO99 power saving requirement
EPA energy star requirement
E2000

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3.9 Display identification

In accordance with VESA Display Channel Standard V1.0 and having DDC 1 and DDC 2B capability

4.0 Visual characteristics

4.1 Test conditions

Unless otherwise specified, this specification is defined under the following conditions.

(1) Input signal: As defined in 3.3, 1024 x 768 non-interlaced mode (68.7 KHz), signal sources must have 75 ohm output impedance,with 0.7Vpp video level.

(2) Luminance setting: controls to be set to 20 ft-lb with full screen 100 % duty cycle white signal.

(3) Warm up: more than 30 minutes after power on with signal supplied.

(4) Ambient light: 400 -- 600 lux.

(5) Ambient temperature: 20 ± 5 □c

(6) Ambient magnetic field: no special ambient magnetic field existed. (the ac leakage flux, dc flux caused by transformer magnet, etc.)

(7) CRT face: East

4.2 Resolution

Inspection modes :

Mode	Resolution	H. freq. / V. freq	Standarc
1.	1024 x 768	60.023Khz/75.029Hz	(VESA/75
2.	1024 x 768	68.677Khz/84.997Hz	(VESA/85
3.	1280 x 1024	79.976Khz/75.024Hz	(VESA/75
4.	1280 x 1024	91.146Khz/85.024Hz	(VESA/85
5.	1600 x 1200	93.75Khz/75.000Hz	(VESA/75
6.	1600 x 1200	106.25Khz/85.000Hz	(VESA/85
7.	1792 x 1344	106.3Khz/75.000Hz	(VESA/75

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4.3 Brightness

Color Temp	Brightness control	Contrast control	White Square (see fig-5)	Fu
	MIN	MIN	-	
	CENTER	MIN	-	<
@9300°K	CENTER	MAX	i 30 FL	i
@6500°K	CENTER	MAX	i 26 FL	
@5500°K	CENTER	MAX	i 23 FL	
@9300°K	MAX	MAX	-	

4.4 Flagwaving - jitter

Less then 0.15mm.

4.5 Image size

4.5.1 Actual display size

The dimensions of the data area, measured along the picture center of horizontal and vertical axis of the screen, are listed below: (see Fig 1)

(355 ± 4 mm) X (265 ± 4 mm)

4.5.2 Max scan size

Maximum active video size should be not smaller than mask opening. The mask opening is 366.2 x 274.6 mm.

4.6 Image centering deviation

? A-B ? and ? C-D ? ? 6 mm, please see Fig 2

4.7 Picture shift range

H-shift range : total > 30 mm.
V-shift range : total > 15 mm.

4.8 Display dimension stability

Due to brightness	: 1.0 %
Due to aging	: 1.0 %
Due to mains voltage	: 1.0 %
Dynamic	: < 1mm

4.9 Geometric distortions

Pincushion, trapezoid, parallelogram, rotation and other various distortions must remain within the limits to tolerance as in Fig. 4.

top/ bottom/left/ right	: 2.5 mm Max.
top plus bottom / left plus right	: 3.5 mm Max.
waviness	: 1.5mm/ 50mm Max.
slope change (Max)	: one

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4.10 Picture tilt

± 1mm (see Fig. 3)

User adjust range for tilt : 1 deg. min.

4.11 Image non-linearity

Horizontal:

Max. - Min.
~~x 100 %~~ ? 8 % (30 - 31.5 KHz)
Max. + Min. ? 7 % (31.6 - 64.0 KHz)
? 5 % (64.1 - 110 KHz)

For any two adjacent blocks ? 5 % (30 - 31.5 KHz)
? 4 % (31.6 - 64.0 KHz)
? 3 % (64.1 - 111 KHz)

Vertical : ¡Ü5 %
For any two adjacent blocks ? 3 %

4.12 Misconvergence

The maximum convergence error should be measured on a white line and represents the maximum distance between the center of the red, green and blue lines over the whole image area.

Max. misconvergence : 0.15 mm in C zone
(Picture area 355X265 See Fig. 6) 0.30 mm in A zone
0.40 mm in B zone

4.13 Focus check

First, adjust brightness to 50 % position and contrast to max., and then generate "@" characters for 1024 lines to cover entire picture area (picture size is shown in sect. 4.5). Characters should be clearly identified at the center and all corners. Character size is shown in Fig. 7.

4.14 Brightness uniformity

With an active video area full white pattern adjusted to 20 - 22 foot lambert, no portion of the pattern shall be less than 75 % of the luminance measured at the CRT center.

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4.15 White color adjustment

There are three factory preset white color 9300°K, 6500°K and 5500°K.

Apply full white pattern, with brightness in 50 % position and the contrast control at max. position. The 1931 CIE Chromaticity (color triangle) diagram (x,y) coordinate for the screen center should be:

9300°K CIE coordinates X = 0.283 ± 0.020
Y = 0.297 ± 0.020

6500°K CIE coordinates X = 0.313 ± 0.020
Y = 0.329 ± 0.020

5500°K CIE coordinates X = 0.332 ± 0.020
Y = 0.347 ± 0.020

4.16 White uniformity

Set the brightness control at center 50 % position, then adjust the contrast control to set the luminance at the center of the screen being in the range of 20 - 22 ft-lb. The color coordinate at any point on the screen should be :

X = X (center) ± 0.015
Y = Y (center) ± 0.015

4.17 Color tracking on full white pattern

Adjust the contrast control from max. to min.(with brightness at click position). The color coordinates should not deviate more than:

x = x (center) +/- 0.015
y = y (center) +/- 0.015

4.18 Purity

Conditions: With full color pattern, with brightness control at 50 % position and contrast control in maximum, under the specific destinations of earth magnetic environments.

After a warm-up time of 30 min., the purity control can be used to eliminate colored stains if it occurs, the monitor should be well degaussed before purity adjustment.

Remark: If the external degaussing is used, the degaussing coil should be a stick type, can't use ring type for MITSUBISHI NF CRT.
To set the electrical current of four corner purity coils and N/S coil (if exist) equal to zero, or switch off the monitor before external degaussing.

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5.0 Mechanical characteristics

5.1 Controls

Front side :
- AC power switch
- OSD function key

Rear :
- D- sub / BNC
- Power cord socket

5.2 Unit dimension / Weight

Set dimension (incl. pedestal) : 456(W) x 467(H) x 437.6(D) mm
Net weight : 24.5 ¡Ó0.5 Kg

5.3 Tilt and swivel base

The display should be equipped with a tilt & swivel device allowing rotation over an angle of 90 degree left or rightward and for a tilt of -5 degree to +15 degree with respect to the horizontal position.

5.4 Transportation packages

5.4.1 Shipping dimension/Weight

Carton dimension : 557(W) x 627(H) x 596(D) mm
Gross weight : 28 .0 ¡Ó0.5Kg

5.4.2 Block unit / Palletization

layers/block	sets/layer	sets/block unit
3	4	12

blocks/container	
20 feet	40 feet
8	20

6.0 Environmental characteristics

The following sections define the interference and susceptibility condition limits that might occur between external environment and the display device.

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6.1 Susceptibility of display to external environment

Operating

- Temperature : 0 to 35 degree C
- Humidity : 10 to 90% (w/o condensation)
- Altitude : 10,000 ft

Storage

- Temperature : -40 to 60 degree C
- Humidity : 5 to 95% (w/o condensation)
- Altitude : 40,000 ft
- Condensation : should be prevented

6.2 Transportation tests

		European version	USA version
Standard		Philips UAN-D1400	NSTA
Drop Test	Height	50cm	45cm
	Sequence	1 corner 3 faces	1 corner 3 edge 6 face
	Test Result	electrical function ok mechanical function ok no serious damage on set appearance (room temp./-10□c, humidity 70 %)	
Vibration Test	Sequence	7 HZ 1.05 G 30 min. for each axis	5-100-5 Hz 0.5 G 15 min. for each axis
	Test Result	electrical function ok mechanical function ok no serious damage on set appearance	
Bump Test	For design evaluation only Operating 10 G, 16 msec, 1000 cycles, z-axes pulse : half sine temperature : 23□C humidity : 60 % air pressure : 100 kpa (according to DSD draft standard UAN-D636)		

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6.3 Display disturbances from external environment
According to IEC 801-2 for ESD disturbances

6.4 Display disturbances to external environment

6.4.1 Ionizatic radiation
Completely fulfilled International Commission of Radiological Protection (ICRP) requirement 0.5 mR/hrs.

7.0 Reliability

7.1 Mean Time Between Failures
MTBF to be calculated according to military standard MIL-HDBK-217C.
MTBF > = 75,000 hrs (excluding CRT)

$$\text{Practice of MTBF} = \frac{\text{Total hrs (power on) x Total sets}}{\text{NO. of failed sets}}$$

8.0 Quality assurance requirements

8.1 Acceptance test
according to MIL-STD-105D Control II level

AQL : 0.65 (major)
2.50 (minor)
(please also refer to annual quality agreement)
Customer acceptance criteria : UAW0377/00

9.0 Serviceability
The serviceability of this monitor should fulfill the requirements which are prescribed in UAW-0346 and must be checked with the check list UAT-0361.

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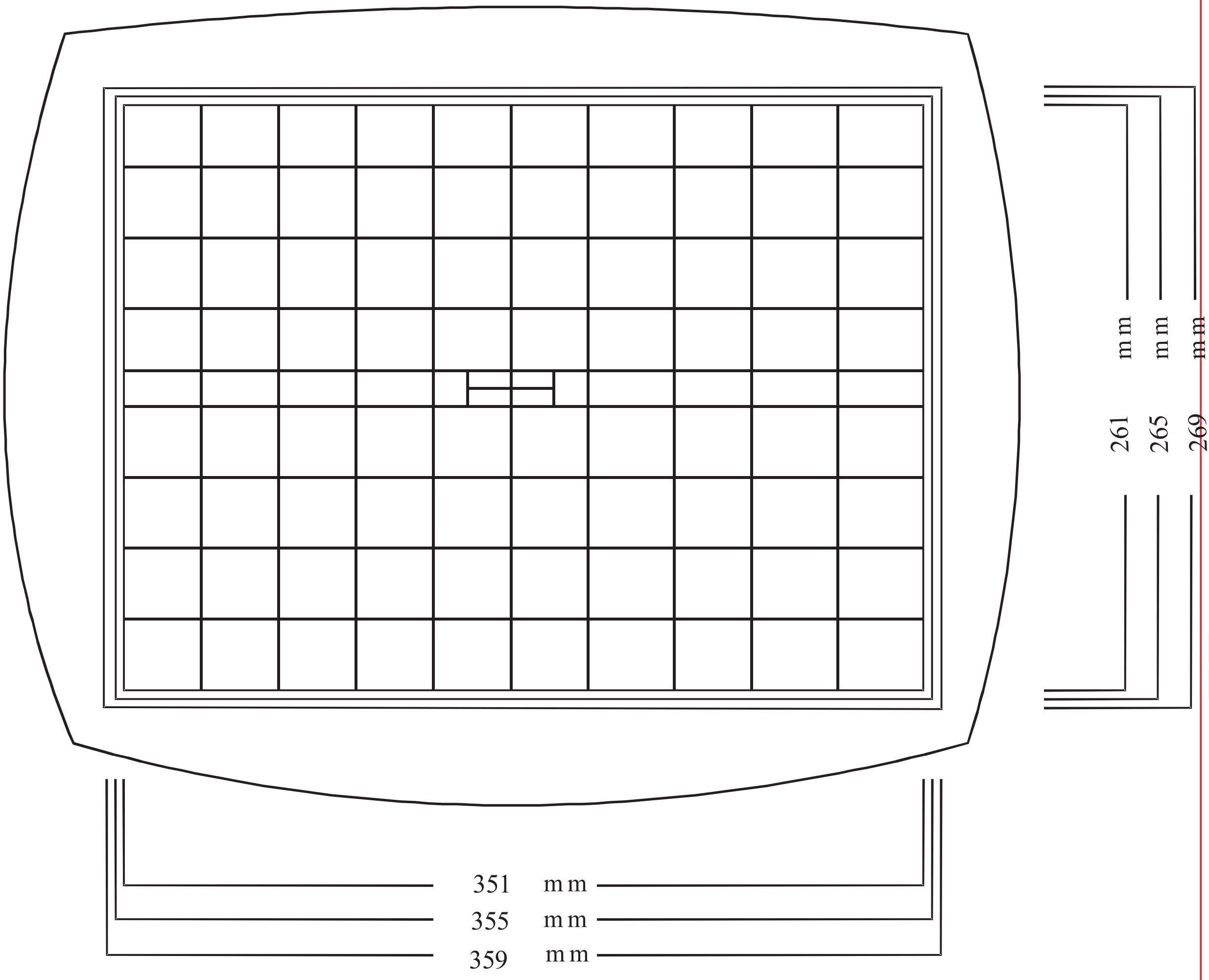
261 mm
265 mm
269 mm
351 mm
355 mm
359 mm

FIG-1 IMAGE DIMENSION

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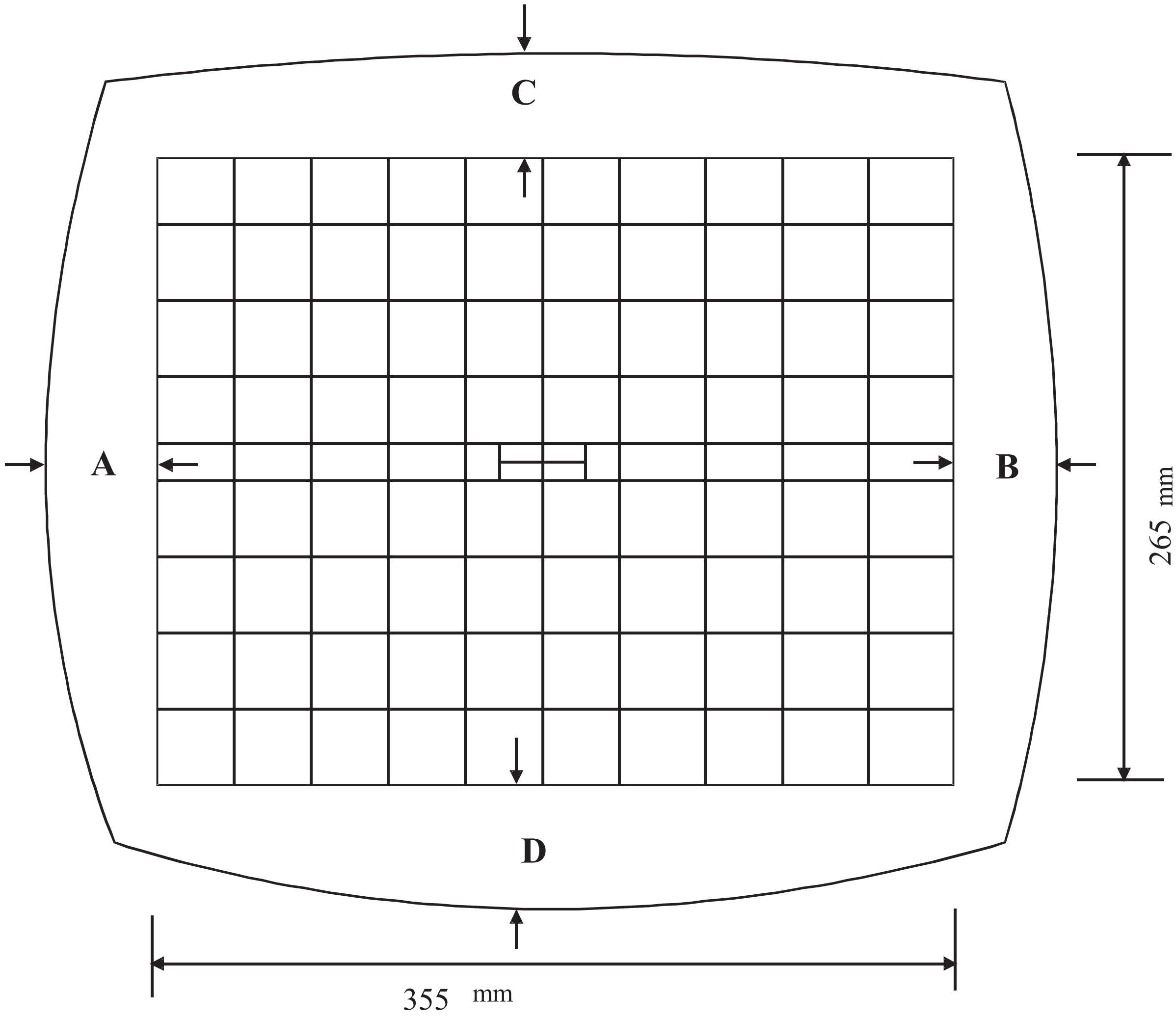

|A-B| AND |C-D| < 6 mm

FIG-2 IMAGE CENTERING

CLASS NO. 00-08-01	19" AUTO SCAN CMTR TYPE : 109P20/00C-CM25+109P2 BRAND : PHILIPS		8639 000 10535		
NAME JACK LIN	SUPERS.	31	590 — 24	10	A4
TY	CHECK	DATE 00-08-01	Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.		

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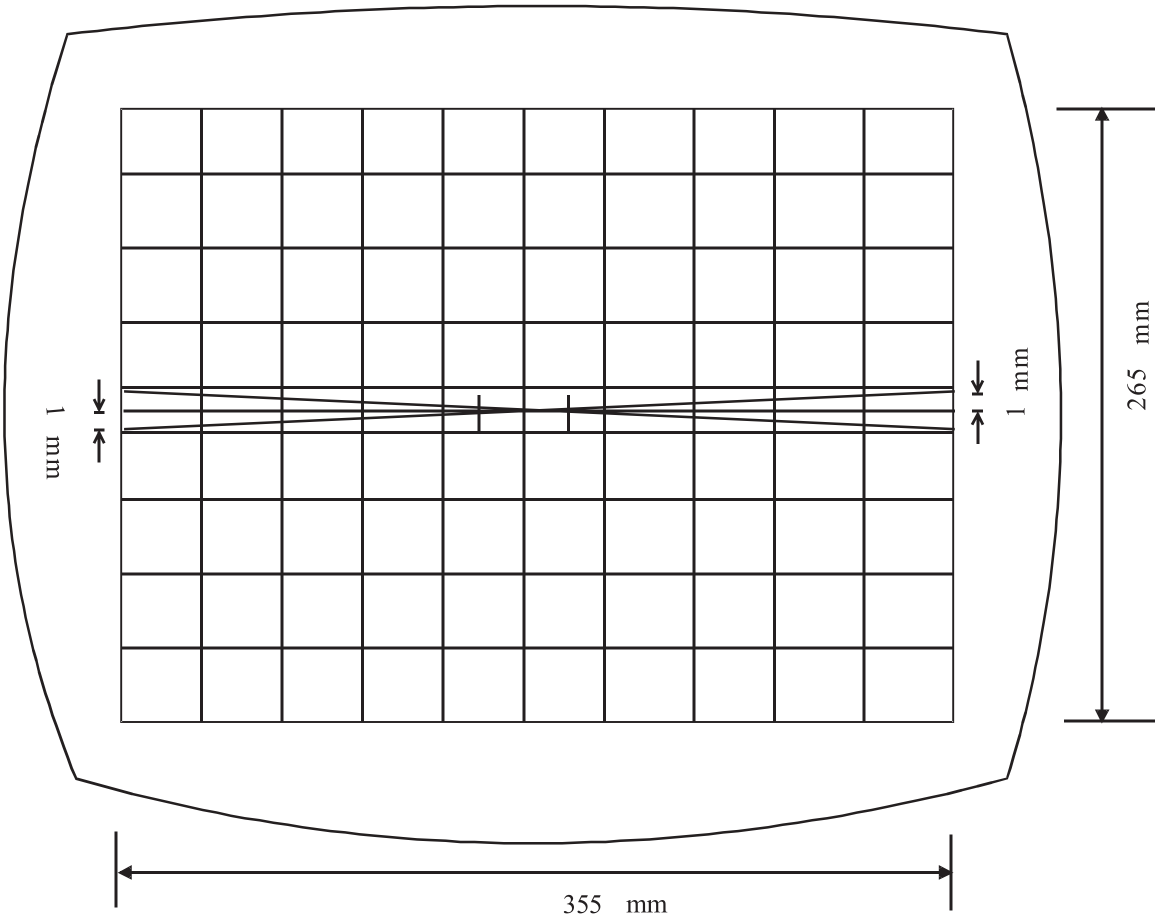

FIG-3 IMAGE ROTATION

CLASS NO.
00-08-01

19" AUTO SCAN CMTR

TYPE : 109P20/00C-CM25+109P2
BRAND : PHILIPS

8639 000 10535

NAME JACK LIN
SUPERS.
31
590 — 25
10
A4

TY
CHECK
DATE 00-08-01
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2838 100 05424

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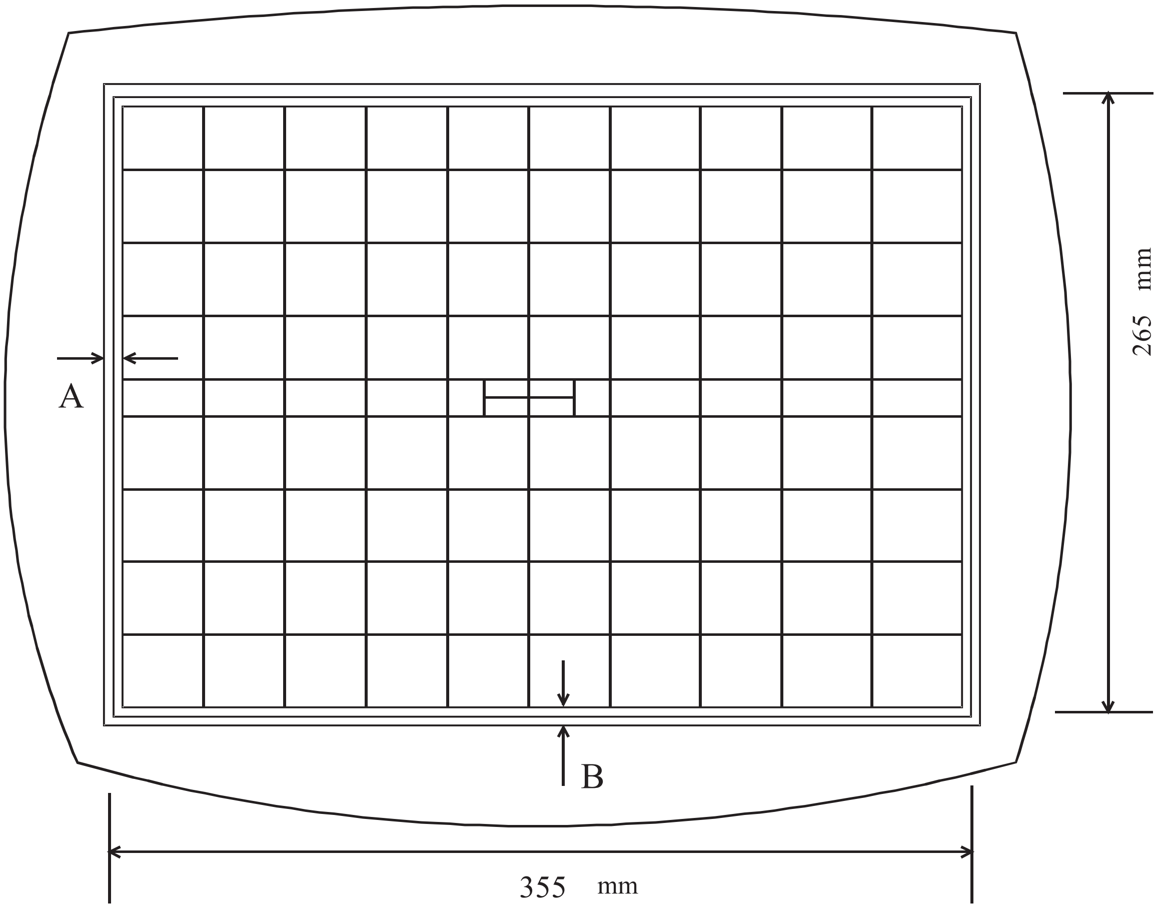

A = B = 2.5 mm

FIG-4 IMAGE GEOMETRY

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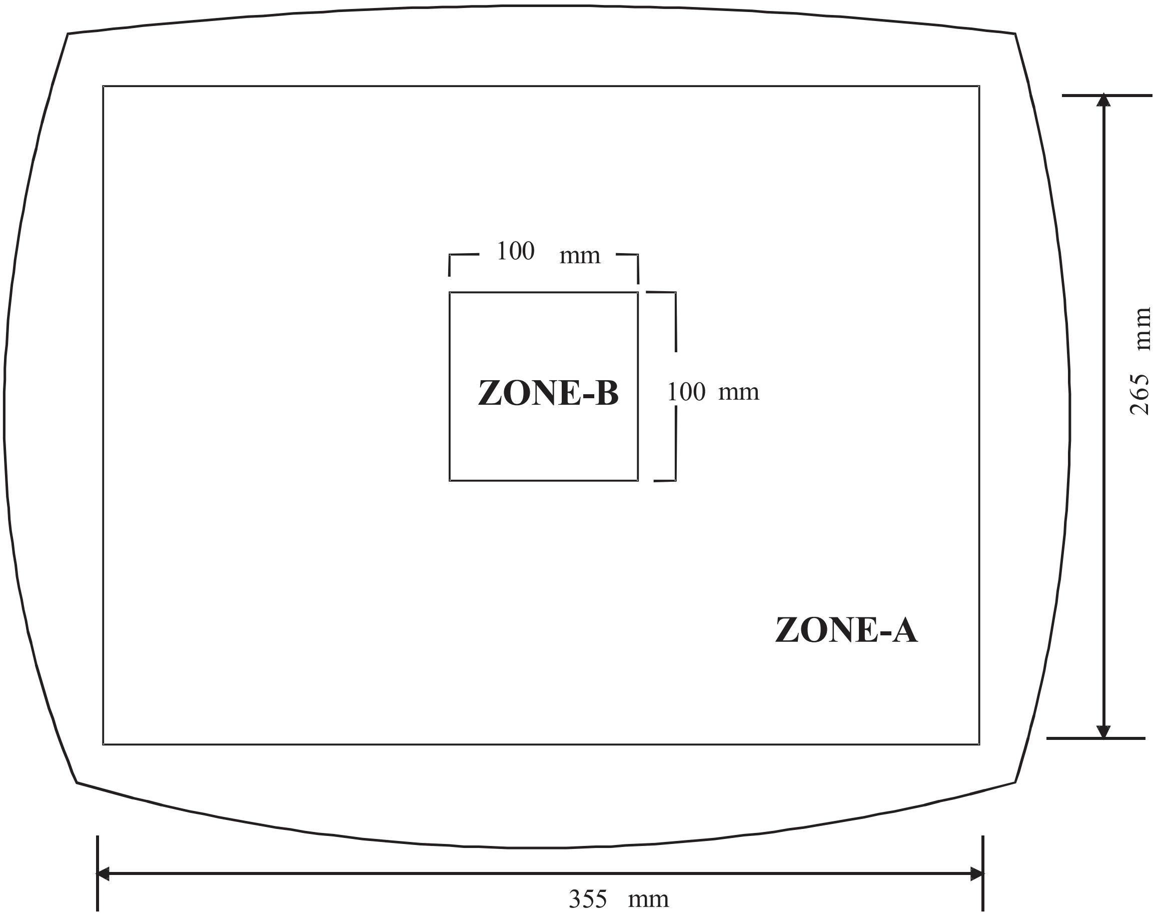

FIG-5 BRIGHTNESS AND CONTRAST MEASUREMENT AREA

CLASS NO. 00-08-01	19" AUTO SCAN CMTR TYPE : 109P20/00C-CM25+109P2 BRAND : PHILIPS	8639 000 10535
NAME JACK LIN	SUPERS.	31
TY	CHECK	DATE 00-08-01

590 — 27 10 A4

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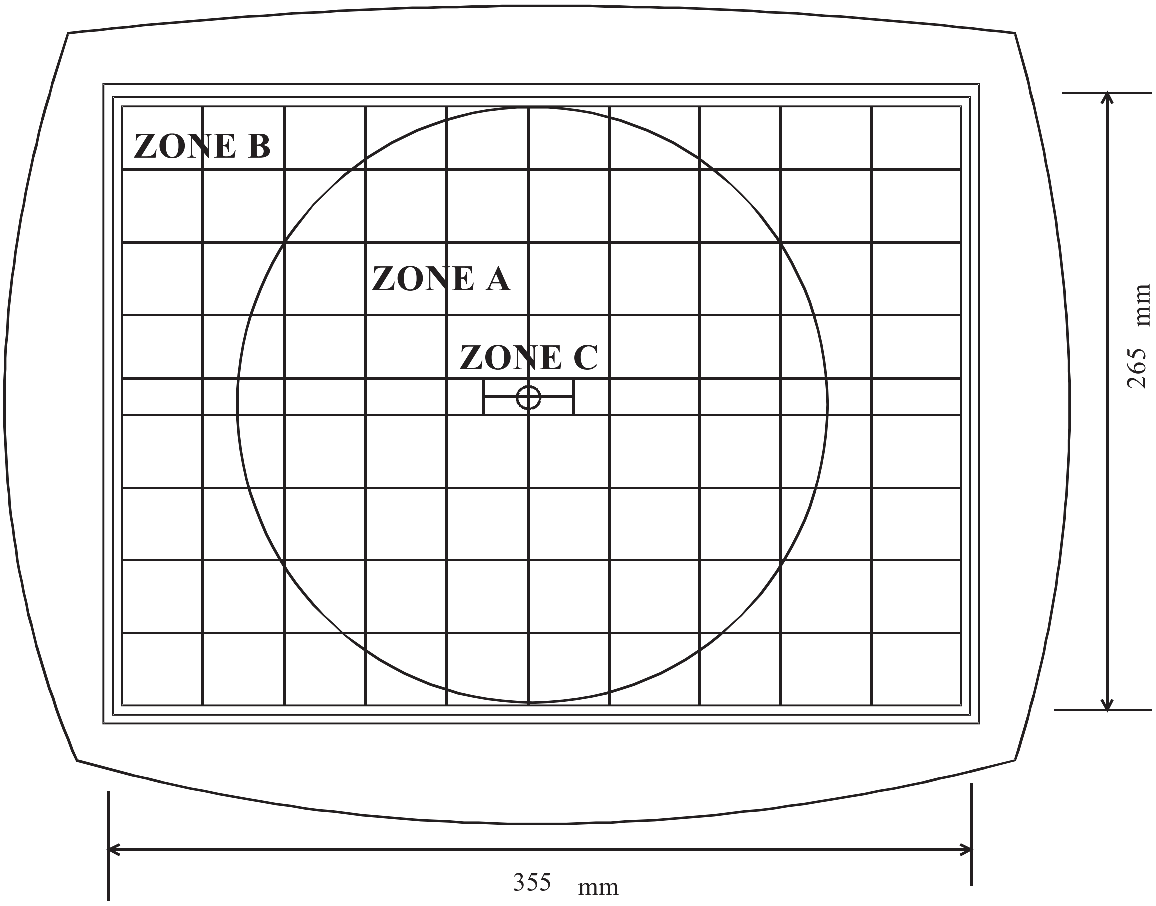

FIG-6 MISCONVERGENCE

CLASS NO.
00-08-01

19" AUTO SCAN CMTR

TYPE : 109P20/00C-CM25+109P2
BRAND : PHILIPS

8639 000 10535

NAME JACK LIN
SUPERS.
31
590 — 28
10
A4

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PHILIPS

1 BYTE = 8BITS

LINE	HEX.DATA		7	6	5	4	3	2	1	0
0	0	0	□	□	□	□	□	□	□	□
1	0	0	□	□	□	□	□	□	□	□
2	3	C	□	□	■	■	■	■	□	□
3	4	2	□	■	□	□	□	□	■	□
4	4	2	□	■	□	□	□	□	■	□
5	5	E	□	■	□	■	■	■	■	□
6	5	2	□	■	□	■	□	□	■	□
7	5	2	□	■	□	■	□	□	■	□
8	5	C	□	■	□	■	■	■	□	□
9	4	0	□	■	□	□	□	□	□	□
A	3	C	□	□	■	■	■	■	□	□
B	0	0	□	□	□	□	□	□	□	□
C	0	0	□	□	□	□	□	□	□	□
D	0	0	□	□	□	□	□	□	□	□
E	0	0	□	□	□	□	□	□	□	□
F	0	0	□	□	□	□	□	□	□	□

Fig 7 CHARACTER FORMAT FOR FOCUS CHECK

CLASS NO.
00-08-01

19" AUTO SCAN CMTR

TYPE : 109P20/00C-CM25+109P2
BRAND : PHILIPS

8639 000 10535

NAME JACK LIN
SUPERS.
31
590 — 29
10
A4
TY
CHECK
DATE 00-08-01

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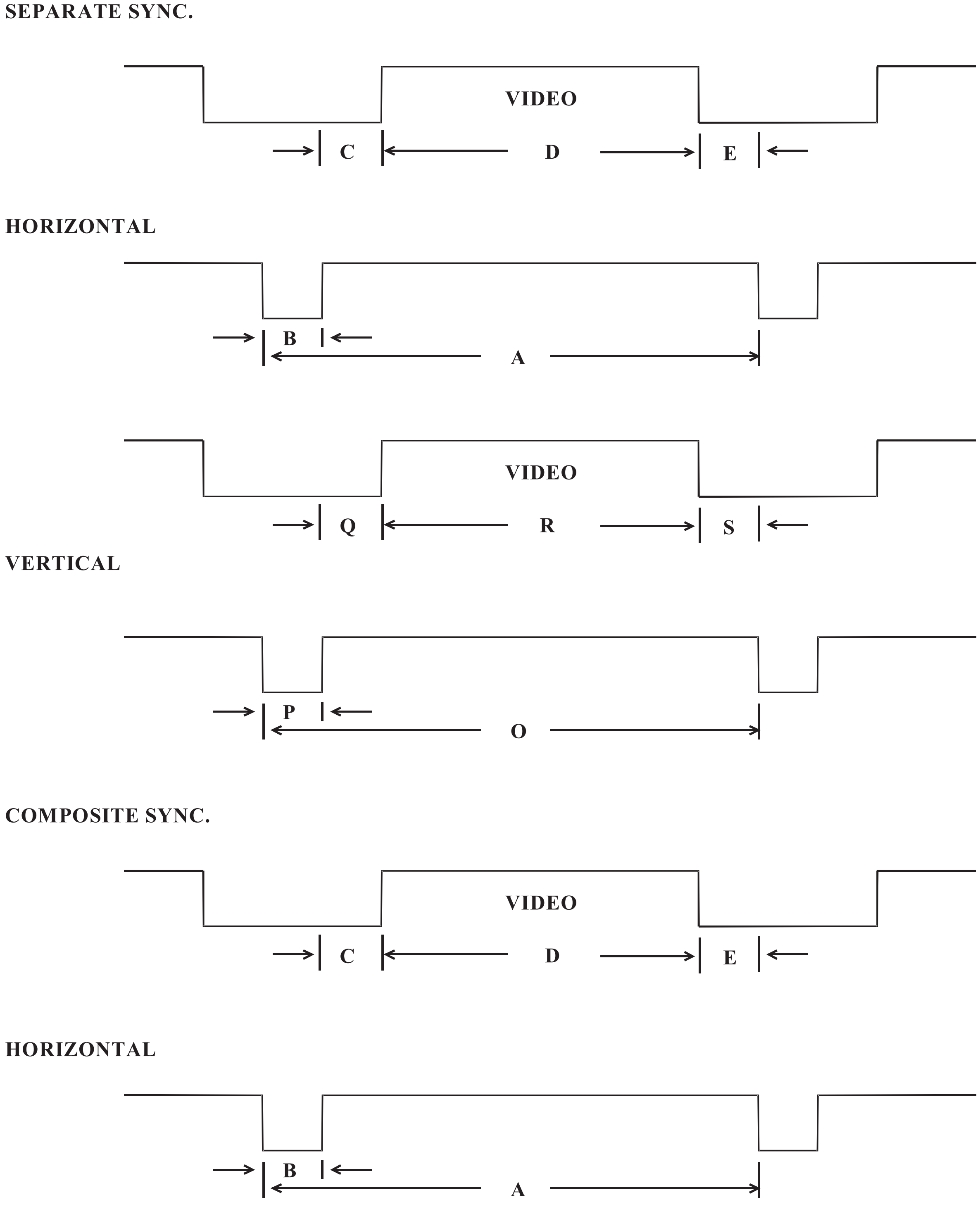
SEPARATE SYNC.
VIDEO
C
D
E
HORIZONTAL
B
A
VIDEO
Q
R
S
VERTICAL
P
O
COMPOSITE SYNC.
VIDEO
C
D
E
HORIZONTAL
B
A

FIG-8 TIMING CHART -1

CLASS NO.
00-08-01

19" AUTO SCAN CMTR
TYPE : 109P20/00C-CM25+109P2
BRAND : PHILIPS

8639 000 10535

NAME JACK LIN
SUPERS.
31
590 — 30
10
A4
TY
CHECK
DATE 00-08-01

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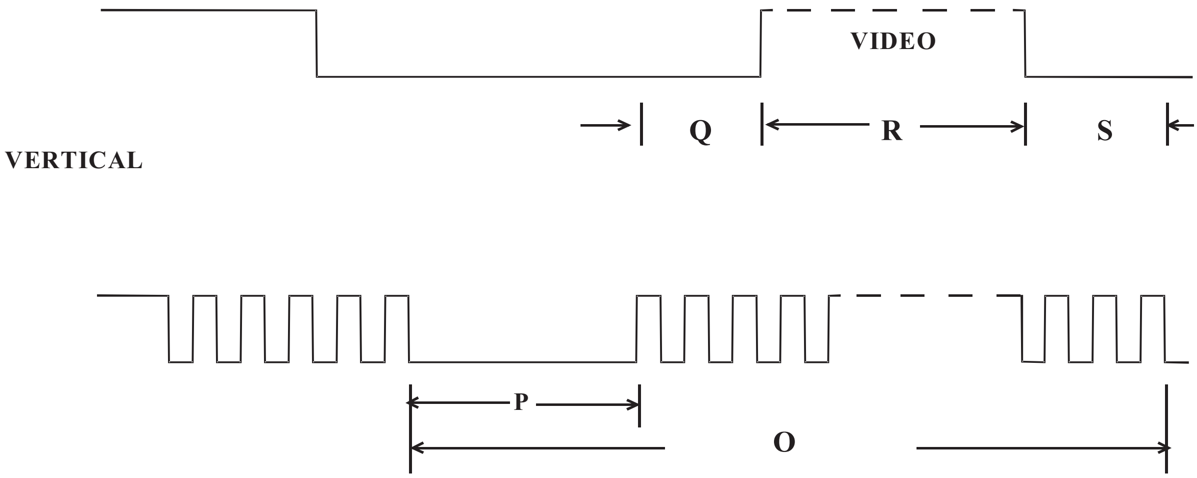

FIG-9 TIMING CHART -2

CLASS NO.

00-08-01

19" AUTO SCAN CMTR

TYPE : 109P20/00C-CM25+109P2
BRAND : PHILIPS

8639 000 10535

NAME JACK LIN
SUPERS.
31
590 — 31
10
A4

TY
CHECK
DATE 00-08-01

Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.

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TELEVISION/MONITOR SAFETY GUIDELINES FOR THE PROFESSIONAL SERVICE TECHNICIAN

Safety Checks

After the original swevice problem has been corrected,a complete safety check should be made. Be sure to check over the entire set, not just the areas where you have worked. Some previous servicer may have left an unsafe condition,which could be unknowingly passed on to your customer. Be sure to check all of the following:

Fire and Shock H azard

1. Be sure all components are positioned in such a way as to avoid the possibility of adjacent component shorts. This is especially important on those chassis which are transported to and feom the service shop.
2. Never release a repaired unit unless all protective devices such as insulators, barries, covers, strain reliefs, and other hardware have been installed in accordance with the original design.
3. Soldering and wiring must be inspected to locate possible cold solder joints,solder splashes,sharp solder points, frayed leads, pinched leads, or damaged insulation (including the ac cord).Be certain to remove loose solder balls and all other loose foreign particles.
4. Check across-the-line components and other components for physical evidence of damage or deteriortion and replace if necessary. Follow original layout,lead length, and dress.
5. No lead or component should touch a receiving tube or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces or edges must be avoided.
6. Critical components having special safety characteristics are identified with ans bythe Ref. No. in the parts list and enclosed within a broken line * (where seceral criticalcomponents are grouped in one area) along with the safety symbols on the schematic diagrams and/or exploded views.
7. When servicing any unit, always use a seoparate isolation transformer for the chassis Failure to use a separate isolation transformer may exopose you to possible shock hazard, and may cause damage to servicing instruments.
8. Many electronic products use a polarized ac line cord (one wide pin on the plug.) Defeating this safety feature may create a potential hazard to the service and the user. Extension cords which do not incorporate the polarizing feature should never be used.
9. After reassembly of the unit, always perform an leakage test or resistance test from the line cord to all exposed metal parts of the cabinet. Also check all metal control shafts(with knobs removed), antenna terminals, handles, screws, etc. to be sure the unit may be safety operted without danger of electrical shock.

* Broken line

Implosion

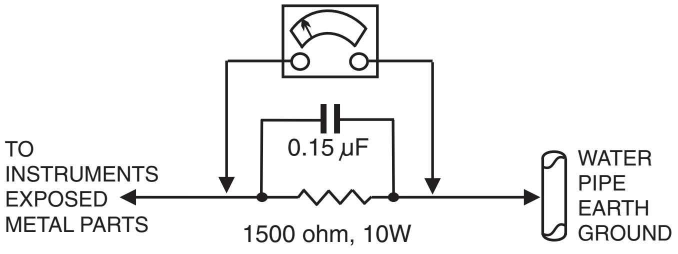
1. All picture tubes used in current model receivers are equipped with an intergral implosion system. Care should always be used, and safety glassesworn,whenever handling any picture tube. Avoid scratching or other rwise damaging the picture tube during installation.
2. Use only replacement tubes specified by the manufacturer.

X-radiation

1. Be sure procedures and instructions to all your service personnel cover the subject of X-radiation. Potential sources of X-rays in TV receivers are the picture tube and the high voltage circuits. The basic precaution which must be exercised is to keep the high voltage at the factory recommended level.
2. To avoid possible exposure to X-radiation and electrical shock, only the manufacturer's specified anode connectors must be used.
3. It is essential that the service technician has an accurate HV meter available at all times. The calibration of this meter should be checked periodically against a reference standard.
4. When the HV circuitry isoperating properly there is no possibility of an x-radiation problem. High voltage should always be kept at the anufacture,s rated value-no higher - for optimum performance. Every time a color set is serviced, the brightness should be run up and down while monitoring the HV with a meter to be certain that the HV is requlated correctlv and does not exceed the specified value. We suggest that you and your technicians review test procedures so that HV requation are always checked as a standard servicing procedure, and the reason for this prudent routine is cleary understood by everyone. It is important to use an accurate and reliable HV meter. It is recommended that the HV recorded on each customer's invoice, which will demonstrate a proper concern for the customer's safety.
5. When troubleshooting and making test measurements in a receiver with a problem of excessive high voltage, reduce the line voltage by means of a Variac to bring the HV into acceptable limits while troubleshooting. Do not operate the chassis longer than necessary to locate the cause of the excessive HV.
6. New picture tubes are specifically designed to withstand higher operathng voltages without creating undesirable X-radiation. It is strongly recommended that any shop test fixture which is to be used with the new higher voltage chassis be equipped with one of the new type tubes designed for this service.Addition of a permanently connected HV meter to the shop test fixture is advisable. The CRT types used in these new sets should never be replaced with any other types,as this may result in excessive X-radiation.
7. It is essential to use the specified picture tube to avoid a possible X-diation problem.
8. Most TV receivers contain some type of emergency "Hold Down" circuit to pervent HV from rising to excessive levels in the presence of a failure mode. These various circuits should be understood by all technicians servicing them, especially since many hold down circuits are inoperative as long as the receiver performs normally.

Leakage Current Cold Check

1. Unplug the ac line cord and connect a jumper between the two prongs of the plug.
2. Turn on the power switch.
3. Measure the resistance value between the jumpered ac plug and all exposed cabinet parts of the receiver, such as screw heads, antennas, and control shafts.When the exposed metallic part has a return path to the chassis, the reading should be between 1 megohm and 5.2 megohms. When the exposed metal does not have a return path to thr chassis, the reading must be infinity.Remove the jumper from the ac line cord.



Leakage Current Hot Check

1. Do not use an isolation transformer for this test. Plug the completely reassembled receiver directly into the ac outlet.
2. Connect a 1.5k, 10w resistor paralleled by a 0.15uf. capacitor between each exposed metallic cabinet part and a good earth ground such as a water pipe, as shown above.
3. Use an ac voltmeter with at least 5000 ohmsy volt sensitivity to measure the potential across the resistor.
4. The potential at any point should not exceed 0.75 volts. A leakage current tester may be used to make this test; leakage current must not exceed 0.5 milliamps. If a measutement is outside of the specified limits, there is a possibility of shock hazard. The receiver should be repaired and rechecked before retutning it to the customer.
5. Repeat the above procedure with the ac plug reversed.(Note: An ac adapter is necessary when a polarized plug is used. Do not defeat the polarizing feature of the plug.)

Picture Tube Replacement

The primary source of X-radiation in this television receiver is the picture tube.The picturetube utilized in this chassis is specially constructed to limit X-radiation emissions. For continued X-radiation protection, the replacement tube must be the same type as the original, including suffix letter,or a Philips approved tupe.

Parts Replacement

Many electrical and mechanical parts in Philips television sets have special safety related charcteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The use of a substitute part which does not have the same safety characteristics as the Philips recommended replacement part shown in this service manual may create shock, fire, or other hazards

WSRNING : Before removing the CRT anode cap, turn the unit **OFF** and short the HIGH VOLTAGE to the CRT DAG ground.
SERVICE NOTE : The CRT DAG is not at chassis ground.